

**INDIANA
DEPARTMENT OF TRANSPORTATION**

CONTRACT INFORMATION

**CONSTRUCTION PLANS
SPECIAL PROVISIONS
ADDITIONAL CONTRACT REQUIREMENTS**

FOR

CONTRACT NO. _____

LETTING DATE: _____

Certified By _____

Date _____

CONTRACT INFORMATION
TABLE OF CONTENTS

CONTRACT NO.

This book shall be examined to determine that each page set out in the Contract Information Table of Contents, and the Special Provisions Table of Contents is attached, legible, and current.

PAGES

CONTRACT INFORMATION
SCHEDULE OF PAY ITEMS
CONSTRUCTION PLANS
TRAFFIC CONTROL DEVICE REPORT
SPECIAL PROVISIONS

PROPOSAL

TO THE
INDIANA DEPARTMENT OF TRANSPORTATION

DATE OF LETTING: November 18, 2003

TIME OF LETTING: 10:00 AM EASTERN STANDARD

LOCATION OF LETTING: Auditorium, Government Center South
402 W. Washington Street
INDIANAPOLIS, INDIANA 46204

LOCATION OF DEPOSIT: N855 Government Center North
100 N. Senate Avenue
INDIANAPOLIS, INDIANA 46204

***** PROJECT EXEMPT FROM FHWA OVERSIGHT *****

CONTRACT NUMBER: RS-27291-A PROJECT NUMBER: 355400E

STRUCTURE NUMBER:

ROUTE: 25

LOCATION: ON SR 25 FROM SR 32 TO US 136(E. JCT.)

DESCRIPTION: ASPHALT RESURFACE

CRAWFORDSVILLE DISTRICT

COUNTY : MONTGOMERY

CONTRACT COMPLETION INFORMATION

CONTRACT DAYS: 28 WORK DAYS

STANDARD SPECIFICATIONS EFFECTIVE DATE 1999

SUPPLEMENTAL SPECIFICATIONS EFFECTIVE DATE 9-1-03

LIST OF APPROVED OR PREQUALIFIED MATERIALS EFFECTIVE DATE 9-1-03

STANDARD DRAWINGS LISTED ON STANDARD DRAWING INDEX EFFECTIVE DATE 9-2-03

SCHEDULE OF PAY ITEMS REVISED:

LETTING DATE: November 18, 2003

CONTRACT ID: RS-27291-A

CONTRACTOR: _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 ASPHALT RESURFACE						
0001	105-06845 CONSTRUCTION ENGINEERING	LUMP	LUMP			.
0002	105-07038 FIELD OFFICE, A	6.000 MOS		.		.
0003	110-01001 MOBILIZATION AND DEMOBILIZATION	LUMP	LUMP			.
0004	202-93741 GUARD RAIL END TREATMENT, REMOVE	4.000 EACH		.		.
0005	303-07449 COMPACTED AGGREGATE, NO. 73	1,200.000 TON		.		.
0006	304-07490 HMA PATCHING, TYPE B	200.000 TON		.		.
0007	306-08034 MILLING, ASPHALT, 1 1/2 IN.	6,000.000 SYS		.		.
0008	401-06264 PROFILOGRAPH, HMA	LUMP	LUMP			.
0009	401-07321 QC/QA-HMA, 2, 64, SURFACE, 9.5 mm	4,720.000 TON		.		.
0010	401-07371 QC/QA-HMA, 2, 64, INTERMEDIATE, 12.5 mm	6,531.000 TON		.		.

SCHEDULE OF PAY ITEMS REVISED:

LETTING DATE: November 18, 2003

CONTRACT ID: RS-27291-A

CONTRACTOR: _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0011	402-07451 HMA, TYPE B, WEDGE AND LEVEL	250.000 TON	.		.	
0012	404-05514 SEAL COAT, 5	9,324.000 SYS	.		.	
0013	406-05520 ASPHALT FOR TACK COAT	27.000 TON	.		.	
0014	601-94689 GUARDRAIL END TREATMENT, OS	4.000 EACH	.		.	
0015	610-07487 HMA FOR APPROACHES, TYPE B	417.000 TON	.		.	
0016	801-06203 TEMPORARY PAVEMENT MARKING, 4 IN.	2,322.000 LFT	.		.	
0017	801-06207 TEMPORARY PAVEMENT MARKING, REMOVABLE, 4 IN.	2,266.000 LFT	.		.	
0018	801-06640 CONSTRUCTION SIGN, A	20.000 EACH	.		.	
0019	801-06775 MAINTAINING TRAFFIC	LUMP	LUMP		.	
0020	808-06703 LINE, THERMOPLASTIC, SOLID, WHITE, 4 IN.	44,844.000 LFT	.		.	
0021	808-75240 LINE, THERMOPLASTIC, BROKEN, YELLOW, 4 IN.	3,973.000 LFT	.		.	

SCHEDULE OF PAY ITEMS REVISED:

LETTING DATE: November 18, 2003

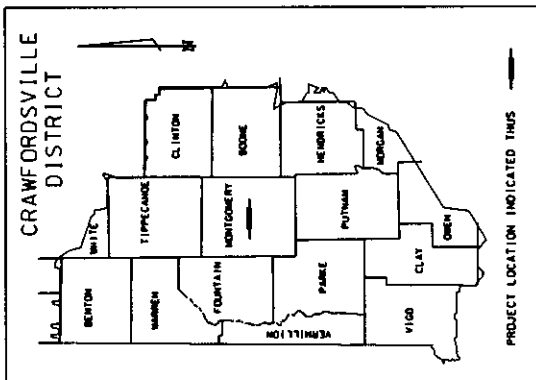
CONTRACT ID: RS-27291-A

CONTRACTOR: _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0022	808-75245 LINE, THERMOPLASTIC, SOLID, YELLOW, 4 IN.	20,371.000 LFT	.		.	
0023	808-75297 TRANSVERSE MARKINGS, THERMOPLASTIC, STOP LINE, 24 IN.	36.000 LFT	.		.	
0024	808-75996 SNOWPLOWABLE RAISED PAVEMENT MARKER, REMOVE	441.000 EACH	.		.	
0025	808-97323 LINE, THERMOPLASTIC, FOR BUZZ STRIPS, 8 IN.	216.000 LFT	.		.	
	SECTION 0001 TOTAL				.	
	TOTAL BID				.	

DES. NO. 0300693

INDIANA
DEPARTMENT OF TRANSPORTATION
-CRAWFORDSVILLE DISTRICT-



LONG. 87° 03' 30" W
LAT. 40° 03' 10" N



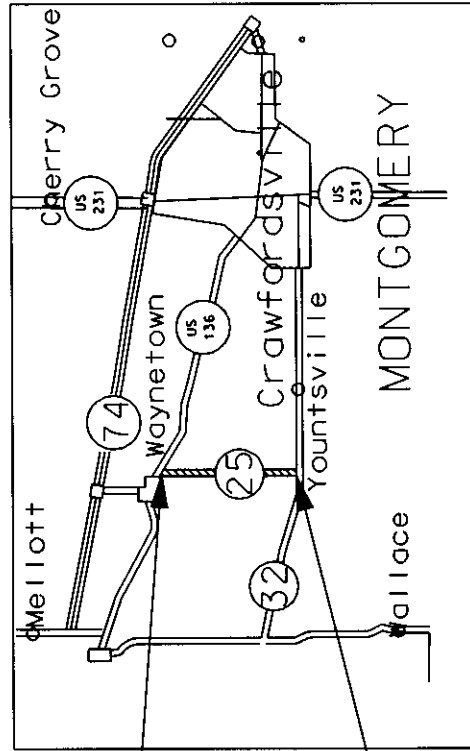
PROPOSED PLAN FOR:

RESURFACE

SR 25 FROM SR 32 (RP 0+00) TO
US 136 (RP 4+305) AT WAYNETOWN, IN.
MONTGOMERY CO.

GROSS LENGTH- 4.31 MI.
NET LENGTH- 4.29 MI.

NOTE: NO ADDITIONAL R/W
REQUIRED WITH THIS PROJECT



END PROJ.
STA. 226+85

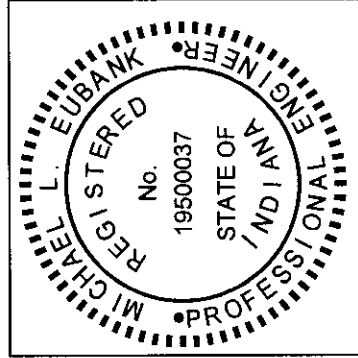
BEGIN PROJ.
STA. 0+25

TRAFFIC DATA	
A.A.D.T. (2004)	1000 V.P.D.
A.A.D.T. (2024)	1190 V.P.D.
DIRECTIONAL DISTRIBUTION	
TRUCKS	50/50%
	3% A.A.D.T.
DESIGN DATA	
DESIGN SPEED	55 MPH
PROJ. DESIGN CRITERIA	PARTIAL 3R
FUNCTIONAL CLASSIFICATION	RMC
RURAL/URBAN	100/0%
TERRAIN	FLAT
ACCESS CONTROL	NONE

PLANS PREPARED BY: Steve H. Thompson DATE July 22, 2003

DESIGNER

(765) 361-5248
TELEPHONE NUMBER



CERTIFIED BY: Michael L. Eubank DATE August 2003

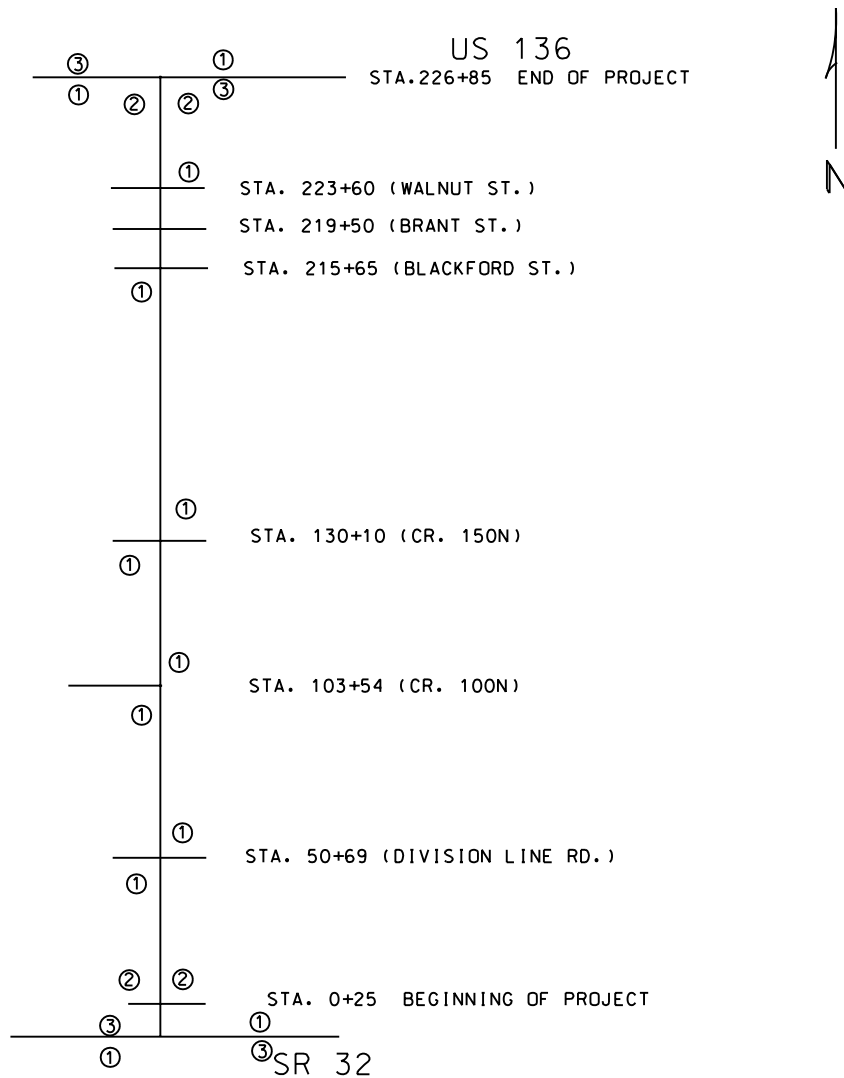
PROFESSIONAL ENGINEER

APPROVED BY: Steve H. Thompson DATE August 1, 2003

DISTRICT DEVELOPMENT ENGINEER

CONSTRUCTION SIGN PLACEMENT

SR 25 MONTGOMERY COUNTY

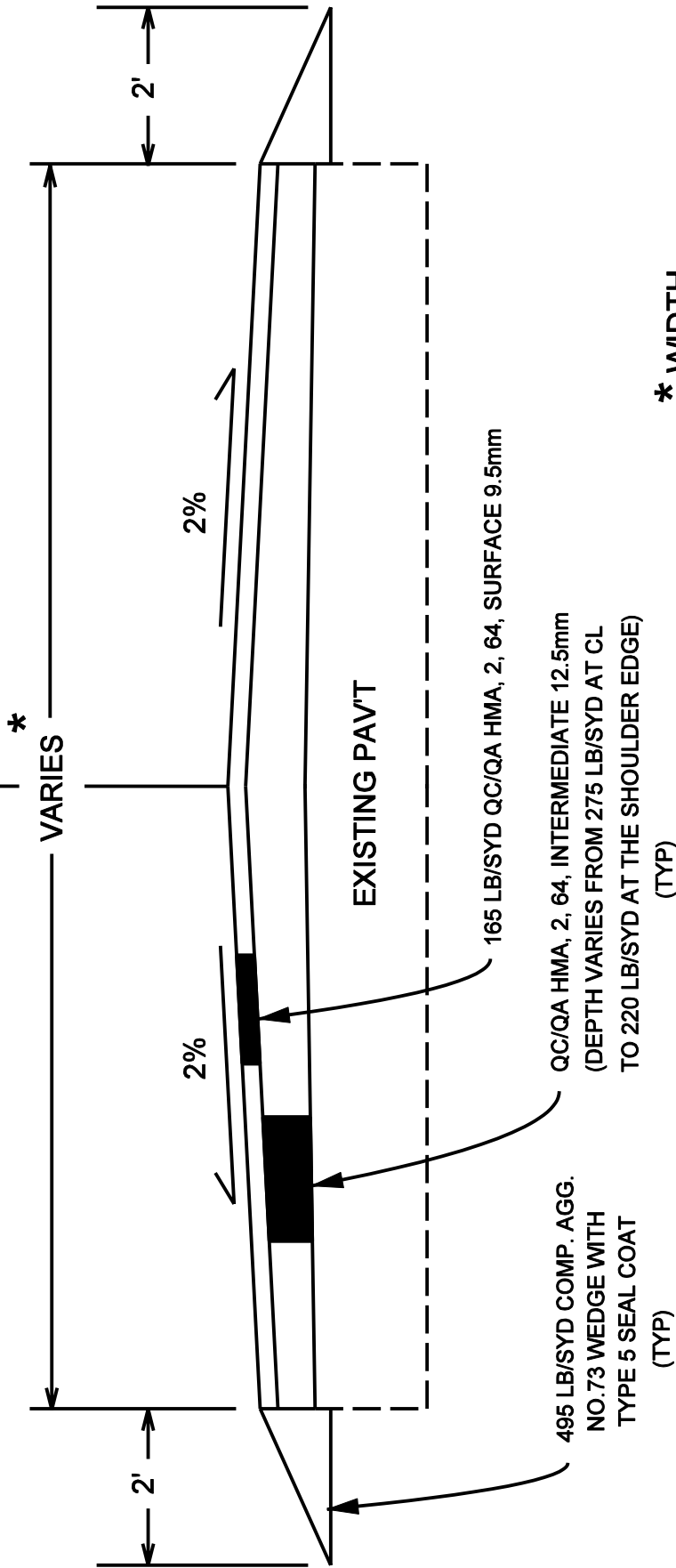


12	①	XW20-1 ROAD CONSTRUCTION AHEAD
4	②	XG20-1 ROAD CONSTRUCTION NEXT <u>4.5</u> MILES
4	③	XG20-2 END CONSTRUCTION
20		TOTAL CONSTRUCTION SIGNS

TYPICAL CROSS SECTION

SR 25

℄

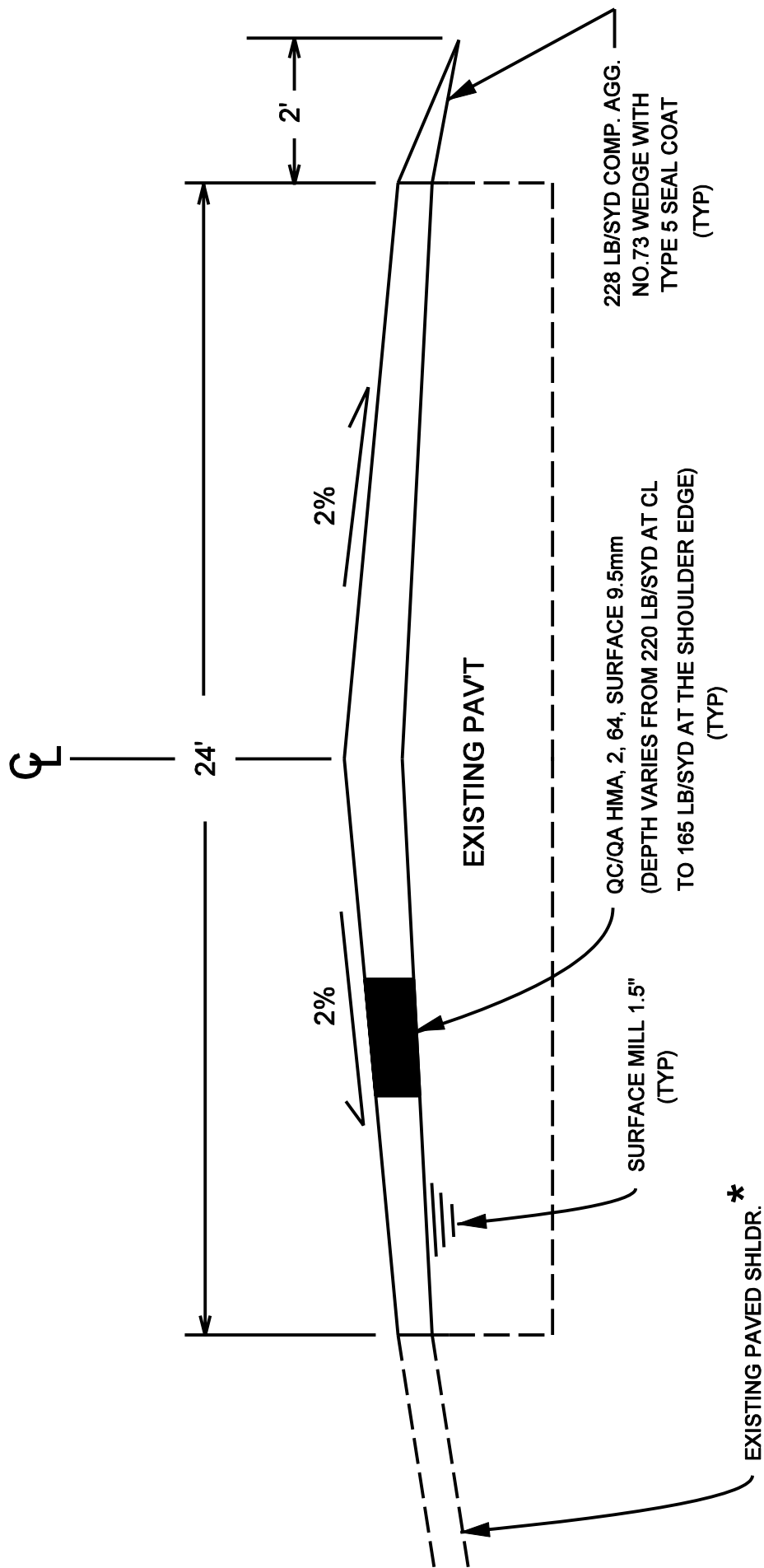


* WIDTH

STA. 0+25 TO STA. 195+00 (22')

STA. 195+00 TO STA. 212+40 (24')

SR 25



STA. 212+40 TO STA. 226+85

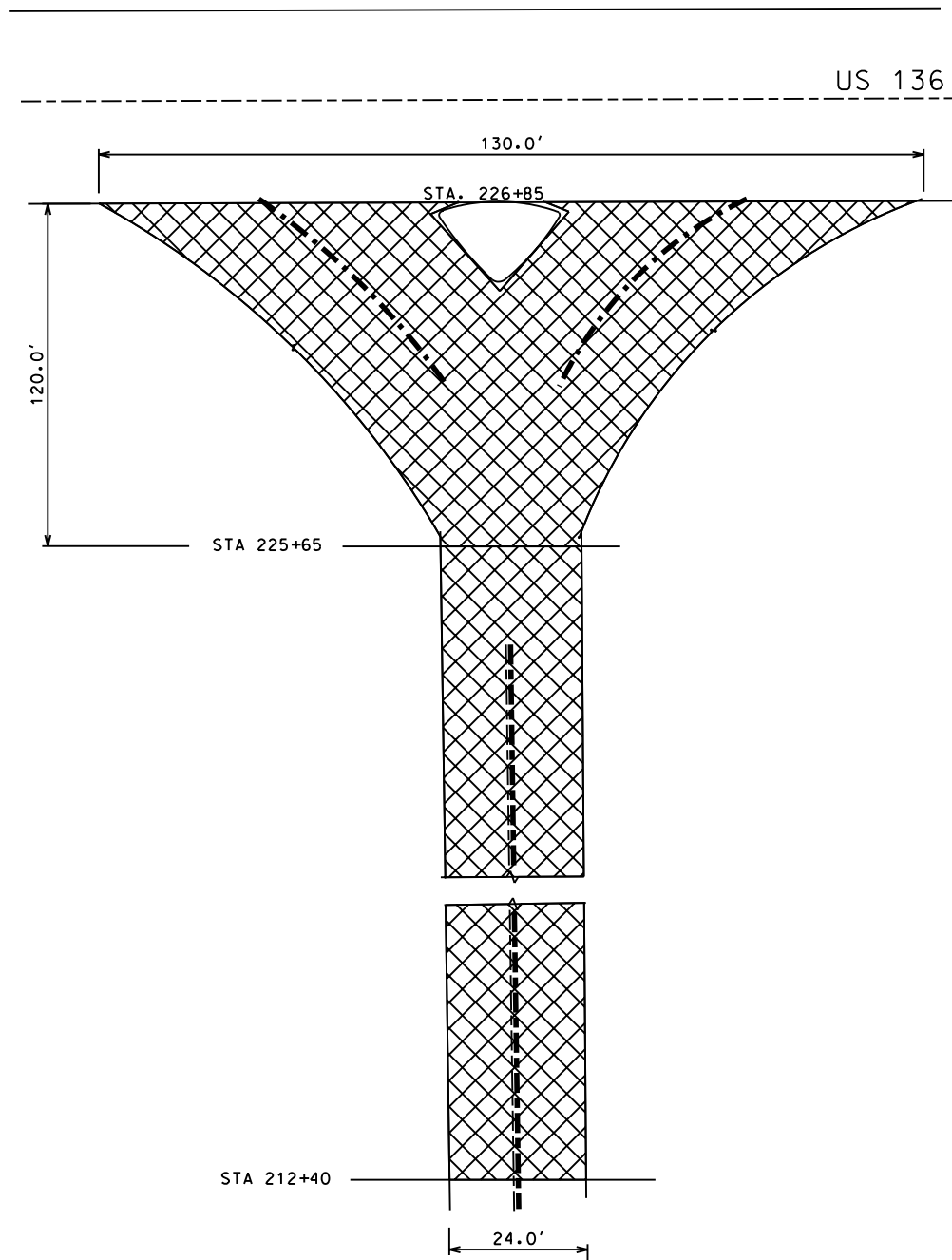
* NOTE: WHERE PAVED SHLDR. DOES NOT EXIST, PLACE 228 LB/SYD COMP. AGG., NO.73 WITH TYPE 5 SEAL COAT.

MILLING AT END OF PROJECT

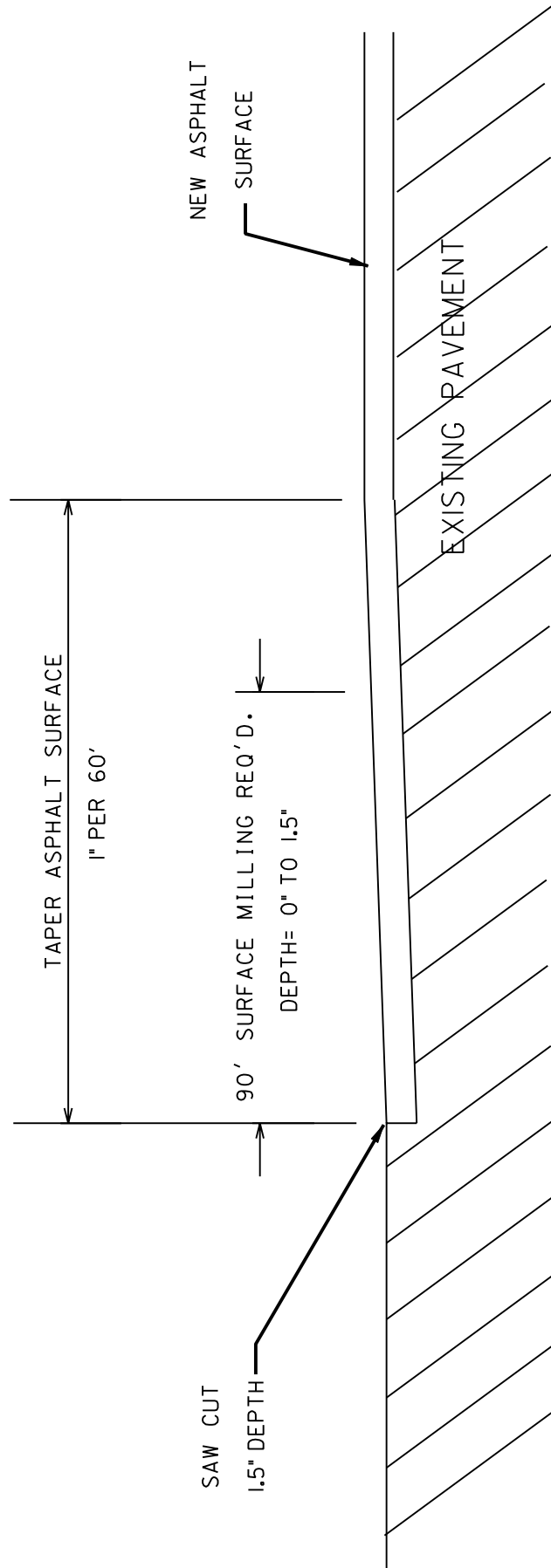
SR 25 MONTGOMERY COUNTY

STA. 212+40 TO STA.226+85

1.5" DEPTH



TYPICAL FEATHERING SECTION



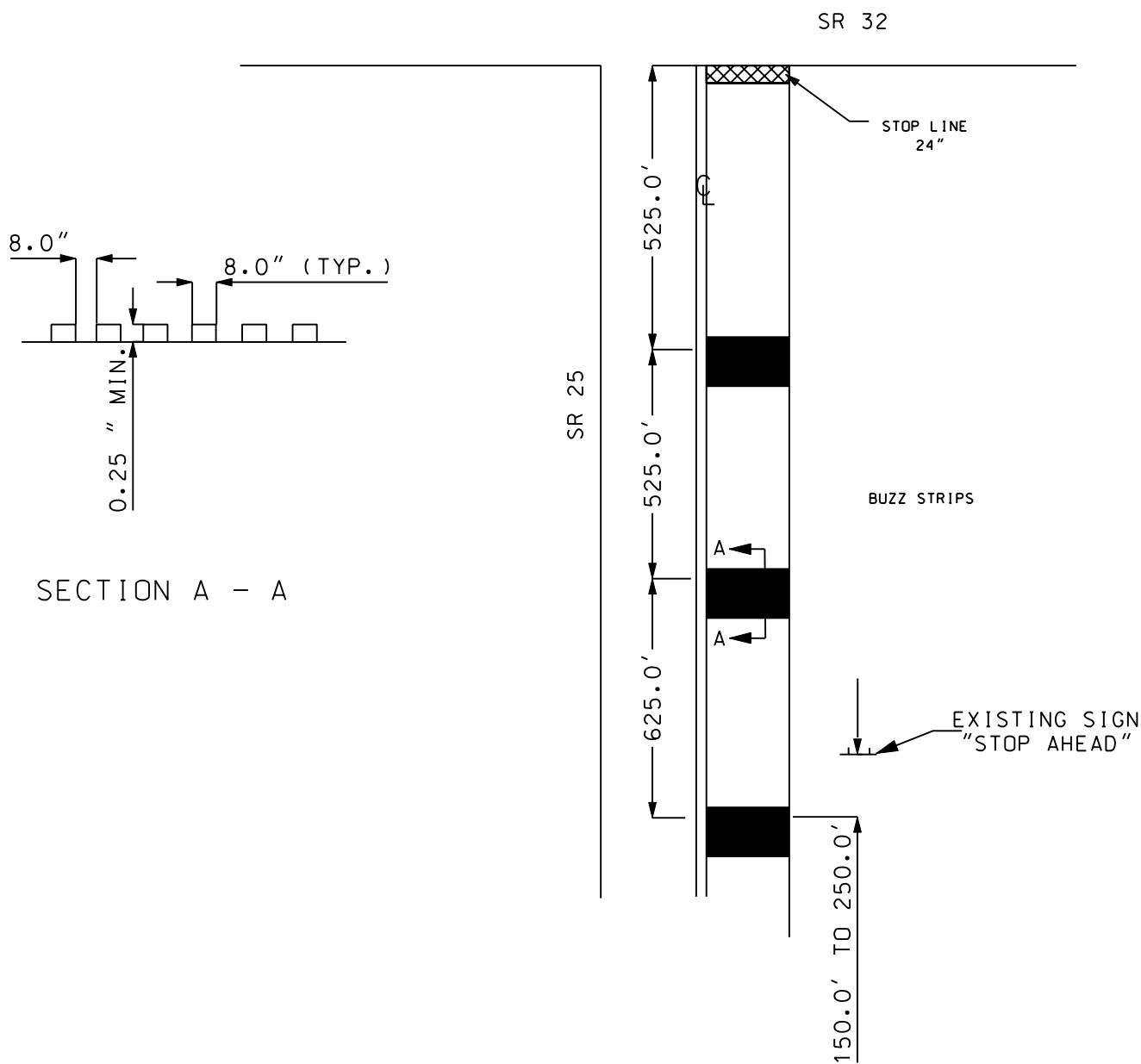
BUZZ STRIP DETAILS AT INTERSECTIONS

RS-27291

(ITEM: LINE, THERMOPLASTIC, FOR BUZZ STRIPS, 8 IN.)

(NOT TO SCALE)

FOR SR 25 AT INTERSECTION WITH SR 32



CONTRACT: _____ PROJECT: _____ DATES: _____ thru _____

[illegible]

* If device is not O.K., describe deficiency under Remarks.

Date Corrective Action Taken: _____

Report Prepared By: _____, Title: _____

SPECIAL PROVISIONS
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Crawfordsville District

PAYMENT OF PREDETERMINED MINIMUM WAGE DETERMINATION
(DAVIS-BACON ACT)
General Decision Number IN030006

Modification Number 0 of General Decision Number IN030006 with a publication date of June 13, 2003 shall apply to this contract.

The above referenced wage determination is available at the Department's Contracts and Construction Division website location: <http://www.state.in.us/dot/div/contracts/letting/index.html>.

Hard copies of the wage determination will be mailed to those Contractors requesting such by calling 1-317-232-5070 or by faxing their request to 1-317-232-0676. They may also be obtained in Room 855, Indiana Government Center North, 100 North Senate Avenue, Indianapolis, IN.

If the wage determination is updated prior to 10 calendar days before the bid opening date, an addendum will be issued.

ROUNDING OF INTERMEDIATE NUMBERS IN CALCULATIONS

The Standard Specifications are revised as follows:

GENERAL NOTES, PAGE 7, DELETE AND INSERT AS FOLLOWS:

8. ~~The~~ *For calculation of results, avoid rounding of intermediate quantities. For reporting results, the rule for addition and subtraction is that the answer shall contain no significant digits farther to the right than occur in the least precise number. The rule for multiplication and division is that the product or quotient shall contain no more significant digits than are contained in the number with the fewest significant digits used in the multiplication.*

PAVEMENT MARKINGS

The Contractor shall make record of the existing pavement marking so that such markings may be replicated later. The District Traffic Section shall be notified two (2) weeks prior to painting or applying pavement markings, so as to allow the District Traffic Section to verify the pavement marking plan and also to verify the existence of the reference post signs.

SPECIAL WASTES

The Standard Specifications are revised as follows:

SECTION 104, BEGIN LINE 242, DELETE AND INSERT AS FOLLOWS:

Regulated materials will consist of those as follows:

- (a) materials which are classified as a hazardous waste, hazardous substance, or hazardous material under the regulations of the EPA or the United States Department of Transportation; *and*

~~(b) materials which are classified as a special waste by the IDEM; and~~

~~(c)~~ (b) materials which contain more than 1% asbestos and are friable, or have high probability of becoming friable as per 326 IAC 14-10.

SECTION 104, AFTER LINE 359, DELETE AND INSERT AS FOLLOWS:

~~(9) —Indiana special waste approval for nonhazardous waste disposal.~~

~~(10)~~ (9) Advanced notification to IDEM for asbestos removal.

~~(11) Special waste disposal permit for on-site disposal of construction debris.~~

SECTION 104, BEGIN LINE 392, DELETE AND INSERT AS FOLLOWS:

104.07 Rights in and Use of Materials Found in the Project Site. Except for hazardous wastes, hazardous substances, hazardous materials, ~~special wastes~~, and asbestos which are subject to 104.06, and lead and zinc bridge painting debris which is subject to 619, all materials designated to be removed from the project and not used in the work shall become the property of the Contractor, unless otherwise set out in the Proposal book. The value of these materials shall be taken into account when the bid is being prepared.

SECTION 202, BEGIN LINE 63, DELETE AND INSERT AS FOLLOWS:

~~(a) Type X Waste. Special waste as classified by IDEM.~~

~~(b)~~ (a) **Type Y Waste.** All waste material that may be disposed of in a Resource Conservation Recovery Act approved landfill.

~~(c)~~ (b) **Type Z Waste.** All waste material that is prohibited from being disposed of in a Resource Conservation Recovery Act approved landfill.

SECTION 619, BEGIN LINE 175, DELETE AND INSERT AS FOLLOWS:

1. Laws to be Observed. Federal and State laws and regulations regulate the disposal of bridge painting debris. Bridge paint debris shall be manifested or certified and shall be disposed of at ~~either special or hazardous waste landfills as an appropriate disposal facility.~~

SECTION 619, BEGIN LINE 211, DELETE AND INSERT AS FOLLOWS:

4. Instruction for Disposal of Paint Waste. Sampling and analysis of the paint waste debris shall be performed to determine if the wastes are hazardous. If the waste is not found to be hazardous in accordance with current RCRA hazardous waste definitions, ~~a special waste certification shall be obtained from IDEM with a copy to the Engineer~~ *the waste material shall be disposed of at an appropriate disposal facility.* If the waste is found to be hazardous, IDEM shall be notified and an EPA identification number will be obtained by the Department. This will be provided to the Contractor within 30 days of the start of waste generation for bridges having hazardous waste paint debris. The waste from different bridges shall not be mixed. The Contractor shall have the responsibilities as follows:

- a. determining the location for disposal, treatment or recycling of the waste, obtaining the Engineer's approval of the site, and arranging with the approved site for the acceptance of the materials;
- b. preparing a ~~special waste certification~~ or hazardous waste manifest, as required by Federal and State requirements, for signature;
- c. scheduling the shipment of waste to the permitted disposal site;
- d. ensuring that the ~~special waste certification~~ or hazardous waste manifest is carried in the transportation vehicle;

SECTION 619, BEGIN LINE 252, DELETE AS FOLLOWS:

If the waste is defined as a hazardous waste in accordance with the current RCRA definitions ~~or if the waste is defined as a special waste in accordance with current IDEM definitions~~, the waste shall be recycled or disposed of in accordance with 619.07(b)4. All project generated wastes and the method of recycling or disposal shall be identified in the QCP.

ENGINEER APPLICATION PERSONAL COMPUTER

The Standard Specifications are revised as follows:

SECTION 105, DELETE LINES 1001 THROUGH 1093.

SECTION 105, AFTER LINE 1094, INSERT AS FOLLOWS:

The computer shall be in accordance with the requirements shown below.

1. *Desktop System.*
 - a. *Microprocessor: Intel Pentium compatible, 500 MHz, or faster.*
 - b. *64 MB RAM, or larger.*
 - c. *One 1.44 MB 3.5 in. floppy disk drive.*
 - d. *One fixed disk (hard drive), minimum 10 GB.*
 - e. *24X CD ROM drive, or faster.*
 - f. *Sound blaster compatible sound system.*
 - g. *An SVGA display adapter, 8 Mb video ram minimum.*
 - h. *MPEG video.*
 - i. *A minimum of one serial port.*
 - j. *One parallel port.*
 - k. *One mouse port with mouse and mouse pad.*
 - l. *A 101 key enhanced keyboard, minimum*
 - m. *A 56 KB V.90 modem*
 - n. *Operating system shall be Windows 98.*
2. *SVGA Display.*
 - a. *A 380 mm (15 in.) color display monitor, or larger.*
 - b. *1024 x 768 resolution*
 - c. *Dot pitch 0.28 mm, or better*

3. *An inkjet printer shall be provided meeting or exceeding the following.*
 - a. *HP compatible print codes.*
 - b. *Fully compatible with DOS programs. HP Deskjet 600 or 900 series. Other brand printers are acceptable if they are equal to the HP 600 or 900 series.*
4. *Software.*
 - a. *Paradox, Ver. 4.5 for DOS.*
 - b. *Microsoft Excell 97, or MS Office 97, or MS Office 2000*
 - c. *Microsoft Word 97, or MS Office 97, or MS Office 2000*
 - d. *McAfee antivirus software for Windows This shall be the latest version and shall be fully installed, with Vshield option activated. The Department will provide periodic updates for the DT and associated files containing new virus names, etc. The Contractor may provide this service if it so desires.*
5. *Miscellaneous Requirements.*
 - a. *Uninterruptible Power Supply (UPS) minimum 280VA/175W (15 minutes) with full time surge suppression and noise isolation, including RJ-11 connections for modem phone line surge protection. American Power Conversion (APC) model Back-UPS Pro 280 (APC part # BP280), or equivalent.*
 - b. *Dust covers for system unit, monitor, and printer.*
 - c. *Black ink cartridges and 8 1/2" x 11" sheet paper for inkjet printers shall be supplied and replenished as needed.*
 - d. *A supplemental phone line in addition to the standard telephone line shall be installed and connected to the PC modem through the UPS surge protection described above. If a supplemental phone line is being installed to accommodate a FAX machine, this same line may be used for joint FAX and PC communications using a line splitter or other appropriate device.*

The requirements shown herein shall be considered as minimum requirements. Equipment or software which exceeds these requirements may be furnished, except where DOS or Windows is specified.

All manuals necessary for operation of the system shall be provided. These shall include manuals for microcomputer operations, Windows operating system, monitor operation, printer operation and code references, and all other manuals or documentation normally furnished with the equipment or software when purchased. Appropriate dust covers shall be provided for all equipment.

The microcomputer system in the field office shall be installed, and maintained in good working order. If a portion of the system becomes defective, inoperative, damaged, or stolen, that portion shall be repaired or replaced within five business days, Mondays through Fridays, after the Contractor is notified of such situation.

The Department will be utilizing the hardware and software specified herein to run Construction Management System software applications. These applications are known to run on Intel compatible equipment. If the Department experiences problems running these applications due to requirement compatibility, the Contractor shall, within five business days, Mondays through Fridays, replace and set up appropriate equipment to ensure compatibility to the satisfaction of the Department.

FAX MACHINE IN FIELD OFFICE
(ADVANCED FEATURES)

The Standard Specifications are revised as follows:

SECTION 105, LINE 956, DELETE AND INSERT AS FOLLOWS:

- b. automatically dial a minimum of ~~25~~ 40 preprogrammed FAX numbers, *and have the ability to program at least 2 groups of numbers;*

SECTION 105, AFTER LINE 988, INSERT AS FOLLOWS:

(6) telephone list

SECTION 105, AFTER LINE 996, INSERT AS FOLLOWS:

- n. *automatically redial a number if line is busy, up to 3 times;*
 - o. *have the ability to send messages in off-peak hours when rates are lower*
-
-

FIELD OFFICE WINDOWS

The Standard Specifications are revised as follows:

SECTION 105, BEGIN LINE 884, INSERT AS FOLLOWS:

There shall be at least two doors and the appropriate number of windows as previously listed, not including windows that are part of the doors, on office trailers. Each door shall have a

BASIS FOR USE OF APPROVED OR PREQUALIFIED MATERIALS

The Standard Specifications are revised as follows:

SECTION 106, AFTER LINE 45, INSERT AS FOLLOWS:

The basis for use of materials shown in the List of Approved or Prequalified Materials will be the Engineer's verification that the materials provided are included in the List of Approved or Prequalified Materials.

SAMPLES, TESTS, CITED SPECIFICATIONS

The Standard Specifications are revised as follows:

SECTION 106, BEGIN LINE 119, DELETE AS FOLLOWS:

The standards for materials and methods of tests of AASHTO and ASTM or other specification referred to herein or elsewhere shall be the standard, interim, or tentative specifications included in the latest published edition which is on file ~~at the Division of Materials and Tests~~ on January 1 ~~of the year of the date of advertisement for bids~~, unless otherwise specified. Indiana Test Methods and Procedures will be

TRAFFIC CONTROL DEVICE REPORT

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 389, INSERT AS FOLLOWS:

A traffic control device report shall be completed weekly by the Contractor and a signed copy given to the Engineer. The cost of the report will not be paid for directly but shall be included in the cost of other items.

STATEMENTS ABOUT EXISTING CONDITIONS OF UTILITIES,
ADDITIONAL RIGHT-OF-WAY, AND ENCROACHMENTS

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 690, INSERT AS FOLLOWS:

107.25 Existing Conditions of Utilities, Additional Right-of-Way, and Encroachments. Such existing conditions are as described below.

(a) Utilities. The status of all utility companies and organizations potentially involved with the work to be performed are described below.

The facilities of Waynetown Electric and Water exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Greg Gayler of the utility may be contacted at 765-234-2154.

The facilities of SBC (Ameritech) exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Brenda Reynolds of the utility may be contacted at 317-265-3645.

The facilities of Tipmont exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Rex Beck of the utility may be contacted at 765-339-7211.

The facilities of Cinergy exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Kevin Johnston of the utility may be contacted at 765-454-6182.

*(b) **Right-of-Way.** There is no involvement of additional right-of-way for the contract.*

*(c) **Encroachments.** There is no involvement of encroachments for the contract.*

*(d) **Other Noteworthy Conditions.** There are no other noteworthy conditions which may affect the prosecution and progress of the contract.*

*(e) **Preconstruction Conference Notification.** The Contractor shall provide notification during the preconstruction conference about known corrections to or omissions of the information presented in 107.25(a) through 107.25(d) above. Otherwise, notification shall be provided as required in 105.06. Notifications regarding such corrections or omissions shall not alleviate the Contractor's inquiry or interpretation obligations as contained in 120 IAC 3-6-6.*

STATE FUNDED CONTRACT REQUIREMENTS

The Standard Specifications are revised as follows:

SECTION 112, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 112 -- STATE FUNDED CONTRACT REQUIREMENTS

***112.01 General Requirements.** The Contractor shall insert in each subcontract all of the stipulations contained herein, and further shall require their inclusion in each lower tier subcontract or purchase order that may in turn be made. These requirements shall not be incorporated by reference. The Contractor shall be responsible for compliance by each subcontractor or lower tier subcontractor with these requirements.*

***112.02 Payment to Laborers.** The rate of wages and fringe benefits for all laborers and mechanics employed on the contract shall be in accordance with the General Decision included in the Contract Information book.*

(a) "Wages", "wage rates", "minimum wages", and "prevailing wages" shall include the basic hourly rate of pay for laborers and mechanics plus the amount contributed by the Contractor and its subcontractors for certain fringe benefits.

(b) The meaning of "fringe benefits" for purposes of the contract shall be defined by the provisions of the Davis-Bacon Act and the interpretation of the fringe benefits regulations as set forth in 29 CFR 5.20 et seq., which are herein incorporated by reference.

- (c) *The term "laborer" shall include at least those workers, including apprentices and trainees, whose duties are manual or physical in nature, including those workers who use tools or who are performing the work of a trade, as distinguished from mental or managerial. The term shall not include workers whose duties are primarily administrative, executive, or clerical.*

112.03 Payment of Predetermined Minimum Wage.

(a) General Requirements.

1. *All laborers employed or working upon the site of the work shall be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account the full amounts of wages and bona fide fringe benefits, or cash equivalents thereof, due at time of payment. The payment shall be computed at wage rates not less than those contained in the General Decision, regardless of any contractual relationship which may be alleged to exist between the Contractor or its subcontractors and such laborers. The General Decision shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this section, contributions made or costs reasonably anticipated for bona fide fringe benefits on behalf of laborers are considered wages paid to such laborers subject to 112.03(c)2. Also, for the purpose of this section, regular contributions made or costs incurred for more than one weekly period, but not less often than quarterly, under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers shall be paid the appropriate wage rate and fringe benefits on the General Decision for the classification of work actually performed, without regard to skill, except as provided in 112.03(d) and 112.03(e).*
2. *Laborers performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.*

(b) Classification.

1. *The Department's contracting officer will require that each class of laborers employed under the contract, which is not listed in the General Decision, shall be classified in conformance with the General Decision.*

2. *The contracting officer will approve an additional classification, wage rate, and its fringe benefits only when the following criteria have been met:*
 - a. *The work to be performed by the additional classification requested is not performed by a classification in the General Decision.*
 - b. *The additional classification is utilized in the area by the construction industry.*
 - c. *The proposed wage rate, including all bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the General Decision.*
 - d. *With respect to helpers, when such a classification prevails in the area in which the work is performed.*
3. *The wage rate, including fringe benefits where appropriate, determined pursuant to the requirements herein shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.*

(c) Payment of Fringe Benefits.

1. *Whenever the minimum wage rate prescribed in the contract for a class of laborers includes a fringe benefit which is not expressed as an hourly rate, the Contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the General Decision or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.*
2. *If the Contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of each laborer the amount of all costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. The Department may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.*

(d) Apprentices and Trainees (Programs of the U.S. Department of Labor).

1. Apprentices.

- a. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Department. A person will be permitted to work as an apprentice if employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.*
- b. The allowable ratio of apprentices to journeyman-level employees on the project site in each craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Each employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the General Decision for the classification of work actually performed. In addition, each apprentice performing work on the project site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the General Decision for the work actually performed. Where the Contractor or a subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates, expressed in percentages of the journeyman-level hourly rate, specified in the Contractor's or subcontractor's registered program shall be observed.*
- c. Every apprentice shall be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the General Decision. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices shall be paid the full amount of fringe benefits listed in the General Decision for the applicable classification.*

- d. *If the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Department, withdraws approval of an apprenticeship program, the Contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.*

2. *Trainees.*

- a. *Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration, or the Department.*
- b. *The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Each employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the General Decision for the classification of work actually performed. In addition, each trainee performing work on the project site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the General Decision for the work actually performed.*
- c. *Every trainee shall be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the General Decision. Trainees shall be paid fringe benefits in accordance with 103.03. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the General Decision unless the Administrator of the DOL's Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the General Decision which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.*
- d. *If the Employment and Training Administration withdraws approval of a training program, the Contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.*

(e) Apprentices and Trainees. Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation are not subject to the requirements of 112.03(d). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

(f) Truck Drivers.

1. *The payment of Davis-Bacon wages to truck drivers shall be in accordance with the decision reached in Building and Construction Trades Dept. v. Midway, (D.C. Cir. 1991) 932 F. 2d 985.*
2. *Davis-Bacon wages shall only apply to laborers who work on the site of the construction work, and not laborers employed off-site, such as suppliers, materialmen, and material delivery truck drivers, regardless of their employer.*
3. *For purposes of the contract, the definition of work subject to Davis-Bacon wages shall include transportation between the actual construction location and a facility which is dedicated to such construction and deemed a part of the site of the work within the meaning of the term "site of the work", as set forth in the regulations at 29 CFR 5.2 et seq. which are herein incorporated by reference.*
4. *"Site of the work" shall be the physical place or places where the construction called for in the contract will remain when work on it has been completed.*
5. *The site of the work shall include off-site facilities such as fabrication plants, mobile factories, batch plants, borrow pits, job headquarters, tool yards, etc., provided they are dedicated exclusively, or nearly so, to the performance of the contract work and are so located in proximity to the actual construction location that it would be reasonable to include them.*
6. *The site of the work shall not include permanent home offices, branch plant establishments, fabrication plants, or tool yards of the Contractor or a subcontractor whose locations and continuance in operation are determined wholly without regard to a particular 100 percent State-funded construction contract or project.*
7. *Fabrication plants, batch plants, borrow pits, job headquarters, tool yards, etc., of a commercial supplier or materialman which are established by a supplier of materials before opening of bids and not on the project site, are not part of the site of the work, even where the operations for a period of time may be dedicated exclusively, or nearly so, to the performance of a contract.*

(g) Withholding. *The Department will upon its own action withhold, or cause to be withheld, from the Contractor or subcontractor under this contract or another contract with the Contractor as much of the accrued payments or advances as may be considered necessary to pay laborers, including apprentices, trainees, and helpers, employed by the Contractor or a subcontractor the full amount of wages required by the contract. In the event of failure to pay a laborer, including an apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Department's contracting officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of further payment, advance, or guarantee of funds until such violations have ceased.*

(h) Overtime Requirements. *No Contractor or subcontractor contracting for a part of the contract work which may require or involve the employment of laborers, including apprentices, trainees, and helpers described in 112.03(d) and 112.03(e) shall require or permit a laborer in a given workweek in which he/she is employed on such work, to work in excess of 40 h in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 h in such workweek.*

(i) Violation: Liability for Unpaid Wages. *In the event of violation of 112.03(g), the Contractor and each subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages.*

(j) Withholding for Unpaid Wages. *The Department will upon its own action withhold, or cause to be withheld, from the monies payable on account of work performed by the Contractor or subcontractor under the contract or another contract with the Contractor, such sums as may be determined to be necessary to satisfy any liabilities of the Contractor or subcontractor for unpaid wages.*

112.04 Statements and Payrolls.

- (a) Payrolls and basic records relating thereto shall be maintained by the Contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, apprentices, and trainees working at the site of the work.*
- (b) The payroll records shall contain the name of each employee; his or her correct classification; hourly rates of wages paid, including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act; daily and weekly number of hours worked; deductions made; and actual wages paid. The Contractor and each subcontractor employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.*

- (c) *The Contractor and each subcontractor shall furnish, each week in which contract work is performed, to the Engineer a payroll of wages paid each of its employees, including apprentices and trainees, described in 112.03(d) and 112.03(e), and watchers and guards engaged on work during the preceding weekly payroll period. The payroll submitted shall set out accurately and completely all of the information required to be maintained in accordance with 112.04(b). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents as Federal stock number 029-005-0014-1, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor shall be responsible for the submission of copies of payrolls by all subcontractors.*
- (d) *Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or its agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:*
- 1. That the payroll for the payroll period contains the information required to be maintained under 112.04(b) and that such information is correct and complete.*
 - 2. That each laborer, including each apprentice and trainee, employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR 3.*
 - 3. That each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.*
- (e) *The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by 112.04 requirement (d).*
- (f) *The Contractor or subcontractor shall make the records required under 112.04 requirement (b) available for inspection, copying, or transcription by authorized representatives of the Department, and shall permit such representatives to interview employees during working hours on the project site. If the Contractor or subcontractor fails to submit the required records or to make them available, the Department, after written notice to the Contractor, may take such actions as may be necessary to cause the suspension of further payment, advance, or guarantee of funds.*

DEMOLITION/RENOVATION NOTIFICATION TO IDEM

The Standard Specifications are revised as follows.

SECTION 202, AFTER LINE 33, INSERT AS FOLLOWS:

In accordance with IAC 14-10, the Contractor shall complete and submit a demolition/renovation notification to IDEM when demolition or renovation of buildings, houses, canopies, and bridges are part of the contract. This notification shall be submitted regardless of whether asbestos containing material is present. Each notification form submitted to IDEM may have a maximum of 10 structures listed on the form. For the purposes of this form, a structure includes a building, house, canopy, or a bridge. Fees for this demolition/renovation notification are \$50.00 per notification and shall be paid to IDEM by the Contractor.

Copies of the demolition/renovation notification form can be obtained at: www.in.gov/icpr/webfile/formsdiv/44593.pdf. Questions concerning the completion of the demolition/renovation notification should be addressed to IDEM's Office of Air Management's toll free number (888) 547-8150. Office hours are Monday through Friday between the hours of 6:30 a.m. and 4:30 p.m. An inspector will assist in proper completion of the notification.

Initial notification to IDEM shall be by certified mail, return receipt requested, or by hand delivery. Verification of this notification shall be provided to the Engineer. The Contractor shall provide such notification 10 work days prior to the date on which demolition or renovation operations are anticipated to begin. If the Contractor postpones the beginning date of demolition or renovation operations, IDEM shall be provided written notice of the new start date, postmarked at least five work days or delivered at least two work days before these operations begin. Verification of this notification shall also be provided to the Engineer.

SECTION 202, BEGIN LINE 275, DELETE AND INSERT AS FOLLOWS:

202.06.1 Inspection and Removal of Asbestos. The Contractor shall comply with all applicable environmental regulations including but not limited to those as follows:

- (a) ~~326 IAC 14-10 requires notification to the IDEM of all demolition or renovation operations. Notification is required for renovation operations only if reportable quantities of asbestos are broken, dislodged or disturbed during the renovation procedure. Initial notification to IDEM shall be by certified mail, return receipt requested, or by hand delivery. Verification of this notification shall be provided to the Engineer. The Contractor shall provide such notification 10 work days prior to the date on which removal or demolition operations are anticipated to begin. In accordance with 202.02 and IAC 14-10, a demolition/renovation notification is to be submitted to IDEM 10 work days prior to the start of demolition or renovation operations. During the 10 work day period, the IDEM may make a determination of the existence of asbestos materials. If the Contractor postpones the beginning date of demolition or removal operations, the IDEM shall be provided written notice of the new start date, postmarked at least five work days or delivered at least two work days before removal or~~

~~demolition begins. Verification of this notification shall also be provided.~~ Local governmental agencies may have additional regulations that must be followed. The Contractor shall contact IDEM's air management office to determine what local agencies have regulations.

REVISIONS FOR HMA 2004

The Standard Specifications are revised as follows:

SECTION 101, AFTER LINE 38, INSERT AS FOLLOWS:

DMTE District Materials and Tests Engineer

SECTION 302, AFTER LINE 43, INSERT AS FOLLOWS:

All displacement or rutting of the aggregate separation layers shall be repaired prior to placing subsequent material.

SECTION 304, BEGIN LINE 140, DELETE AND INSERT AS FOLLOWS:

Widening mixtures shall be HMA mixtures in accordance with ~~401 for QC/QA HMA mixtures and 402 for HMA mixtures~~ and as shown on the typical section or as directed.

~~The ESAL category for QC/QA HMA mixtures identified in the pay item shall be in accordance with 401.04.~~

SECTION 304, BEGIN LINE 160, DELETE AS FOLLOWS:

A MAF in accordance with ~~401.05 or 402.05~~ will not apply. ~~QC/QA HMA mixtures will be accepted in accordance with 401.09 and~~ HMA mixtures will be accepted in accordance with 402.09.

SECTION 304, BEGIN LINE 180, DELETE AS FOLLOWS:

~~Widening with QC/QA HMA, _____, _____, _____ mm..... Mg (TON))~~
~~(ESAL⁽¹⁾) (PG⁽²⁾) (Course⁽³⁾) (Mix⁽⁴⁾)~~

** Mixture Type in accordance with 402.04*

(1) ESAL Category as defined in 304.05

(2) Number represents the high temperature binder grade. Low temperature grades are -22

(3) Surface, Intermediate, or Base

(4) Mixture Designation

SECTION 401, DELETE LINES 1 through 657.

SECTION 401, AFTER LINE 658 INSERT AS FOLLOWS:

SECTION 401 – QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA, PAVEMENT

401.01 Description. *This work shall consist of one or more courses of QC/QA HMA base, intermediate, or surface mixtures constructed on prepared foundations in accordance with 105.03.*

401.02 Quality Control. *The HMA shall be supplied from a certified HMA plant in accordance with ITM 583; Certified Volumetric Hot Mix Asphalt Producer Program. The HMA shall be transported and placed according to a Quality Control Plan, QCP, prepared and submitted by the Contractor in accordance with ITM 803; Contractor Quality Control Plans for Hot Mix Asphalt Pavements. The QCP shall be submitted to the Engineer at least 15 days prior to commencing HMA paving operations.*

MATERIAL

401.03 Materials. *Materials shall be in accordance with the following:*

<i>Asphalt Materials</i>	
PG Binder	902.01(a)
Coarse Aggregates	904
<i>Base Mixtures - Class D or Higher</i>	
<i>Intermediate Mixtures - Class C or Higher</i>	
* <i>Surface Mixtures - Class B or Higher</i>	
Fibers	AASHTO MP 8
Fine Aggregates	904
* <i>Surface aggregate requirements are listed in 904.03(d).</i>	

401.04 Design Mix Formula. *A design mix formula, DMF, shall be prepared in accordance with 401.05 and submitted in a format acceptable to the Engineer one week prior to use. The DMF shall state the maximum particle size in the mixture. The DMF shall state the calibration factor, test temperature and absorption factors to be used for the determination of binder content using the ignition oven in accordance with ITM 586, the binder content by extraction in accordance with ITM 571, and a Mixture Adjustment Factor (MAF). The DMF shall state the source, type, and dosage rate of any stabilizing additives. Approval of the DMF will be based on the ESAL and mixture designation. A mixture number will be assigned by the Engineer. No mixture will be accepted until the DMF has been approved.*

The ESAL category identified in the pay item correlates to the following ESAL ranges:

<i>ESAL CATEGORY</i>	<i>ESAL</i>
<i>1</i>	<i>< 300,000</i>
<i>2</i>	<i>300,000 to < 3,000,000</i>
<i>3</i>	<i>3,000,000 to < 10,000,000</i>
<i>4</i>	<i>10,000,000 to < 30,000,000</i>
<i>5</i>	<i>≥ 30,000,000</i>

401.05 Volumetric Mix Design. *The DMF shall be determined for each mixture from a volumetric mix design by a design laboratory selected from the Department's list of approved Mix Design Laboratories. A volumetric mixture shall be designed in accordance with the respective AASHTO and ASTM references as listed below.*

*Standard Specification for Superpave
Volumetric Mix Design AASHTO MP 2*

*Standard Specification for Designing
Stone Matrix Asphalt (SMA) AASHTO MP 8*

*Standard Practice for Short and Long Term
Aging of Hot Mix Asphalt (HMA) AASHTO R 30*

Standard Practice for Designing Superpave HMA AASHTO PP 28

*Maximum Specific Gravity of Bituminous
Paving Mixtures AASHTO T 209*

*Resistance of Compacted Bituminous Mixture to
Moisture Induced Damage AASHTO T 283*

*Method for Preparing and Determining the
Density of Hot Mix Asphalt (HMA)
Specimens by Means of the SHRP
Gyratory Compactor AASHTO T 312*

*Bulk Specific Gravity of Compacted Bituminous
Mixtures Using Automatic Vacuum Sealing ASTM D 6752*

The single percentage of aggregate passing each required sieve shall be within the limits of the following gradation tables.

	<i>Dense Graded, Mixture Designation – Control Point (Percent Passing)</i>							
	25.0 mm		19.0 mm		12.5 mm		9.5 mm	
<i>Sieve Size</i>								
50.0 mm								
37.5 mm	100.0							
25.0 mm	90.0 - 100.0		100.0					
19.0 mm	< 90.0		90.0 - 100.0		100.0			
12.5 mm			< 90.0		90.0 - 100.0		100.0	
9.5 mm					< 90.0		90.0 - 100.0	
<i>Note 1</i>	<i>A</i>	<i>B</i>	<i>A</i>	<i>B</i>	<i>A</i>	<i>B</i>	<i>A</i>	<i>B</i>
4.75 mm	≤ 39.5	≥ 39.5					< 90.0	< 90.0
2.36 mm	19.0 - 26.8	30.8 - 45.0	23.0 - 34.6	34.6 - 49.0	28.0 - 39.1	39.1 - 58.0	32.0 - 47.2	47.2 - 67.0
1.18 mm	≤ 18.1	≥ 24.1	≤ 22.3	≥ 28.3	≤ 25.6	≥ 31.6	≤ 31.6	≥ 37.6
600 μm	≤ 13.6	≥ 17.6	≤ 16.7	≥ 20.7	≤ 19.1	≥ 23.1	≤ 23.5	≥ 27.5
300 μm	≤ 11.4	≥ 11.4	≤ 13.7	≥ 13.7	≤ 15.5	≥ 15.5	≤ 18.7	≥ 18.7
75 μm	1.0 - 7.0		2.0 - 8.0		2.0 - 10.0		2.0 - 10.0	

NOTE 1: Either sub-column A or B shall be used consistently for 4.75 mm to 300 μm sieves.

NOTE 2: Column A refers to beneath the restricted zone. Column B refers to above the restricted zone.

<i>Open Graded, Mixture Designation – Control Point (Percent Passing)</i>		
	<i>C19.0</i>	<i>C25.0</i>
<i>Sieve Size</i>		
<i>37.5 mm</i>		<i>100.0</i>
<i>25.0 mm</i>	<i>100.0</i>	<i>70.0 - 98.0</i>
<i>19.0 mm</i>	<i>70.0 - 98.0</i>	<i>50.0 - 85.0</i>
<i>12.5 mm</i>	<i>40.0 - 68.0</i>	<i>28.0 - 62.0</i>
<i>9.5 mm</i>	<i>20.0 - 52.0</i>	<i>15.0 - 50.0</i>
<i>4.75 mm</i>	<i>10.0 - 30.0</i>	<i>6.0 - 30.0</i>
<i>2.36 mm</i>	<i>15.0 ± 8.0</i>	<i>15.0 ± 8.0</i>
<i>1.18 mm</i>	<i>2.0 -18.0</i>	<i>2.0 -18.0</i>
<i>600 µm</i>	<i>1.0 -13.0</i>	<i>1.0 -13.0</i>
<i>300 µm</i>	<i>0.0 -10.0</i>	<i>0.0 -10.0</i>
<i>150 µm</i>	<i>0.0 -9.0</i>	<i>0.0 -9.0</i>
<i>75 µm</i>	<i>0.0 -8.0</i>	<i>0.0 -8.0</i>
<i>Percent of Binder</i>	<i>> 3.0</i>	<i>> 3.0</i>

Dust/Calculated Effective Binder Ratio shall be from 0.6 to 1.2, when the aggregate gradation passes above the boundaries of the restricted zone and 0.8 to 1.6 when the aggregate gradation passes beneath the boundaries of the restricted zone. The optimum binder content for dense graded mixtures shall produce 4.0% air voids at N_{des} and for open graded mixtures shall produce 15.0%-20.0% air voids at N_{des} . The design shall have at least four points, including a minimum of two points above and one point below the optimum. The maximum specific gravity of the uncompacted mixture shall be determined in accordance with AASHTO T 209.

The percent draindown of open graded mixtures shall not exceed 0.30% in accordance with AASHTO T 305. Open graded mixtures may incorporate fibers.

Dense graded mixture shall be tested for moisture susceptibility in accordance with AASHTO T 283 except that the loose mixture curing shall be replaced by short term aging for 2 h in accordance with AASHTO R 30. The minimum tensile strength ratio, TSR, shall be 80%. The 150 mm (6 in.) mixture specimens shall be compacted in accordance with AASHTO T 312. If anti-stripping additives are added to the mixture to be in accordance with the minimum TSR requirements, the dosage rate shall be submitted with the DMF.

The MAF equals the Gmm from the mixture design divided by the following: 2.465 for 9.5 mm mixtures and 2.500 for 12.5 mm, 19.0 mm, and 25.0 mm mixtures. If the MAF calculation results in a value where $0.960 \leq \text{MAF} \leq 1.040$, then the MAF shall be considered to be 1.000. If the calculated MAF is outside of the above range, then the actual calculated value shall be used.

Changes in the source or types of aggregates shall require a new DMF. A new DMF shall be submitted to the District Materials and Tests Engineer for approval one week prior to use.

Changes in the source of specified binders, except for PG 58-28 or PG 64-22, shall require a new DMF.

The mixture design compaction temperature for the specimens shall be 150°C (300°F) for dense graded mixtures and 125°C (260°F) for open graded mixtures.

Design criteria for each mixture shall be based on the ESAL shown in the contract documents and shall be as follows:

<i>GYRATORY COMPACTION EFFORT</i>					
<i>ESAL</i>	<i>N_{ini}* </i>	<i>N_{des}* </i>	<i>N_{max}* </i>	<i>Max. % Gmm @ N_{ini}</i>	<i>Max. % Gmm @ N_{max}</i>
<i>DENSE GRADED</i>					
<i>< 300,000</i>	<i>6</i>	<i>50</i>	<i>75</i>	<i>91.5</i>	<i>98.0</i>
<i>300,000 to < 3,000,000</i>	<i>7</i>	<i>75</i>	<i>115</i>	<i>90.5</i>	<i>98.0</i>
<i>3,000,000 to < 10,000,000</i>	<i>8</i>	<i>100</i>	<i>160</i>	<i>89.0</i>	<i>98.0</i>
<i>10,000,000 to < 30,000,000</i>	<i>8</i>	<i>100</i>	<i>160</i>	<i>89.0</i>	<i>98.0</i>
<i>≥ 30,000,000</i>	<i>9</i>	<i>125</i>	<i>205</i>	<i>89.0</i>	<i>98.0</i>
<i>OPEN GRADED</i>					
<i>ALL ESAL</i>	<i>NA</i>	<i>20</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>

** N_{ini}, N_{des}, N_{max} - definitions are included in AASHTO PP 28.*

<i>VOIDS IN MINERAL AGGREGATE (VMA) CRITERIA @ N_{des}</i>	
<i>Mixture Designation</i>	<i>Minimum VMA, Percent</i>
<i>9.5 mm</i>	<i>15.0</i>
<i>12.5 mm</i>	<i>14.0</i>
<i>19.0 mm</i>	<i>13.0</i>
<i>25.0 mm</i>	<i>12.0</i>
<i>37.5 mm</i>	<i>11.0</i>
<i>C19.0 mm</i>	<i>NA</i>
<i>C25.0 mm</i>	<i>NA</i>

<i>VOIDS FILLED WITH ASPHALT (VFA) CRITERIA @ N_{des}</i>	
<i>ESAL</i>	<i>VFA, Percent</i>
<i>< 300,000</i>	<i>70 - 80</i>
<i>300,000 to < 3,000,000</i>	<i>65 - 78</i>
<i>3,000,000 to < 10,000,000</i>	<i>65 - 75</i>
<i>10,000,000 < 30,000,000</i>	<i>65 - 75</i>
<i>≥ 30,000,000</i>	<i>65 - 75</i>

Note 1: For 9.5 mm mixtures, the specified VFA range shall be 73% to 76% for design traffic levels ≥ 3 million ESALS.

Note 2: For 25.0 mm mixtures, the specified lower limit of the VFA shall be 67% for design traffic levels < 0.3 million ESALS.

Note 3: For 37.5 mm mixtures, the specified lower limit of the VFA shall be 64% for all design traffic levels.

Note 4: For C19.0 mm and C25.0 mm mixtures, VFA is not applicable.

401.06 Recycled Materials. Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 50 mm (2 in.) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25.0% by mass (weight) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 5.0% by mass (weight) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the DMF.

Mainline surface or open graded mixtures shall not contain recycled materials.

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 401.05.

Mixtures containing 15.0% or less RAP, shall use the same grade of binder as specified. The binder for mixtures containing greater than 15.0% and up to 25.0% RAP shall be reduced by one temperature classification, 6°C, for both the upper and lower temperature classifications.

401.07 Lots and Sublots. Lots will be defined as 4000 Mg (4000 t) of base or intermediate mixtures or 2400 Mg (2400 t) of surface mixture. Lots will be further sub-divided into sublots not to exceed 1000 Mg (1000 t) of base or intermediate mixtures or 600 Mg (600 t) of surface mixture. Partial sublots of 100 Mg (100 t) or less will be added to the previous subplot. Partial sublots greater than 100 Mg (100 t) constitute a full subplot.

401.08 Job Mix Formula. A job mix formula, JMF, shall be developed by a certified HMA producer. A JMF used in the current or previous calendar year that was developed to N_{des} will be allowed. The mixture compaction temperature shall be 150°C (300°F) for dense graded mixtures and 125°C (260°F) for open graded mixtures. The JMF for each mixture shall be submitted to the Engineer and shall use the same MAF as the DMF.

401.09 Acceptance of Mixtures. Acceptance of mixtures for binder content, VMA at N_{des} , and air voids at N_{des} for each lot will be based on tests performed by the Engineer. Acceptance testing for surface mixtures will include tests for moisture content. The Engineer will randomly select the location(s) within each subplot for sampling in accordance with the ITM 802. An acceptance sample will consist of two plate samples

with the first being at the random location and the second 0.6 m (2 ft) ahead station. A backup sample consisting of two plate samples shall be located 0.6 m (2 ft) towards the center of the mat from the acceptance sample. For surface mixtures, an additional sample shall be located 0.6 m (2 ft) back station from the random sample location.

Samples from each location shall be obtained from each subplot from the pavement in accordance with ITM 580.

The binder content will be determined in accordance with ITM 586 or ITM 571 as directed by the Engineer. The maximum specific gravity will be determined in accordance with AASHTO T 209. The Air Voids and VMA will be determined in accordance with AASHTO PP 28 based on the average bulk specific gravity from two gyratory specimens. The gyratory pills will be prepared in accordance with AASHTO T 312.

The bulk specific gravity of gyratory specimens for dense graded mixtures will be determined in accordance with AASHTO T 166. The bulk specific gravity of gyratory specimens for open graded mixtures, C19.0, C25.0 will be determined in accordance with ASTM D 6752, except as follows. The duration of the test from initiating the vacuum extraction to weighing the specimen after the water bath will not exceed five minutes. The mass of water absorbed by the specimen while in the water bath will be subtracted from the mass of the specimen obtained in the water bath. Any test in which the mass of water absorbed by the specimen exceeds 2% of the sample mass is invalid.

The mixture properties for each subplot shall meet the requirements for the tolerances from the JMF as shown in the table as follows.

ACCEPTANCE TOLERANCES	
MIXTURE PROPERTIES	TOLERANCES FROM JMF
DENSE GRADED	
Air Voids	JMF \pm 1.0 %
Binder Content	JMF \pm 0.5 %
VMA	JMF \pm 1.0 %
OPEN GRADED	
Air Voids *	JMF \pm 3.0 %
Binder Content	JMF \pm 0.5 %

* Gmb will be determined in accordance with ASTM D 6752

The maximum percent of moisture in the mixture shall not exceed 0.10 from plate samples.

A binder draindown test in accordance with AASHTO T 305 for open graded mixtures shall be completed once per lot in accordance with 401.07 and shall not exceed 0.50%.

The Engineer's acceptance test results for each subplot will be available when the testing is complete.

Air voids, binder content and VMA values will be reported to the nearest 0.1%. Moisture and draindown test results will be rounded to the nearest 0.01%. Rounding will be in accordance with 109.01(a).

Pay factors will be determined in accordance with 401.19(a).

The Contractor may request an appeal of the Engineer's test results in accordance with 401.20.

Fibers incorporated into the mixture will be accepted on the basis of a type A certification for the specified material properties for each shipment of fibers. Fibers from different manufacturers and different types of fibers shall not be intermixed.

In the event that an acceptance sample is not available to represent a subplot(s), all test results of the previous subplot will be used for acceptance. If the previous subplot is not available, the subsequent subplot will be used for acceptance.

CONSTRUCTION REQUIREMENTS

401.10 General. Equipment for HMA operations shall be in accordance with 409.

Fuel oil, kerosene, or solvents shall not be transported in open containers on equipment. Cleaning of equipment and small tools shall not be accomplished on the pavement or shoulder areas.

Segregation, flushing or bleeding of HMA mixtures will not be permitted. Corrective action shall be taken to prevent continuation of these conditions. Segregated, flushed or bleeding HMA mixtures shall be removed if directed. All areas showing an excess or deficiency of binder shall be removed and replaced.

All mixtures that become loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced.

401.11 Preparation of Surfaces to be Overlaid. *The subgrade shall be shaped to the required grade and sections, free from all ruts, corrugations, or other irregularities, and uniformly compacted and approved in accordance with 207. Milling of an existing pavement surface shall be in accordance with 202.05. Surfaces on which a mixture is placed shall be free from objectionable or foreign materials at the time of placement.*

Compacted aggregate bases and rubblized pavements shall be primed in accordance with 405. PCCP, milled asphalt surfaces, and asphalt surfaces shall be tacked in accordance with 406. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

401.12 Process Control. *The Engineer and Contractor will jointly review the operations to ensure compliance with the QCP. Continuous violations of compliance with the QCP will result in suspension of paving operations.*

401.13 Weather Limitations. *HMA courses of less than 75 kg/m² (138 lb/syd) shall be placed when the ambient temperature and the temperature of the surface on which it is to be placed is 7°C (45°F) or above. No mixture shall be placed on a frozen subgrade.*

401.14 Spreading and Finishing. *The mixture shall be placed upon an approved surface by means of laydown equipment in accordance with 409.03(c). Prior to paving, both the planned quantity and lay rate shall be adjusted by multiplying by the MAF. When mixture is produced from more than one DMF or JMF for a given pay item, the MAF will be applied to the applicable portion of the mixture for each. The temperature of each mixture at the time of spreading shall not be more than 10°C (18°F) below the minimum mixing temperature as shown on the JMF for mixtures compacted in accordance with 402.15.*

Planned HMA courses greater than 90 kg/m² (165 lb/syd) placed under traffic, shall be brought up even with each adjacent lane at the end of each work day. Planned HMA courses less than or equal to 90 kg/m² (165 lb/syd) shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane. Traffic shall not be allowed on open graded mixtures.

Hydraulic extensions on the paver will not be permitted for continuous paving operations. Fixed extensions or extendable screeds shall be used on courses greater than the nominal width of the paver except in areas where the paving widths vary. Hydraulic extensions may be used in tapers and added lanes less than 75 m (250 ft) in length.

Automatic slope and grade controls shall be used as outlined in the QCP.

HMA mainline and HMA shoulders which are 2.4 m (8.0 ft) or more in width shall be placed with paving equipment in accordance with 409.03(c)1.

When laying mixtures with density not controlled by cores, the speed of the paver shall not exceed 15 m (50 ft) per min. Rollers shall be operated to avoid shoving of the HMA and at speeds not to exceed 4.5 km/h (3 mph). However, vibratory rollers will be limited to 4 km/h (2.5 mph).

The finished thickness of any course shall be at least two times but not more than four times the maximum particle size as shown on the DMF.

401.15 Joints. *Longitudinal joints in the surface shall be at the lanelines of the pavement. Longitudinal joints below the surface shall be offset from previously constructed joints by approximately 150 mm (6 in.), and be located within 300 mm (12 in.) of the lane line.*

Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course. For areas inaccessible to rollers, other mechanical devices shall be used to achieve the required density.

If constructed under traffic, temporary transverse joints shall be feathered to provide a smooth transition to the driving surface.

401.16 Density. *Acceptance will be based on lots and sublots in accordance with 401.07.*

Density of the compacted dense graded mixture will be determined from cores except where:

- (a) the total planned lay rate to be placed over a shoulder existing prior to the contract award is less than 210 kg/m² (385 lb/syd); or*
- (b) the first lift of material placed at less than 210 kg/m² (385 lb/syd) over a shoulder existing prior to the contract award.*

Density of any random core location(s) in these areas will be assigned a value of 92.0 %MSG and compaction shall be in accordance with 402.15.

Open graded mixtures shall be compacted with six passes of a static tandem roller and will be assigned a value of 84.0% for %MSG. Vibratory rollers shall not be used on open graded mixtures.

Density acceptance by cores will be based on samples obtained from two random locations selected by the Engineer within each subplot in accordance with ITM 802. One core shall be cut at each random location in accordance with ITM 580. The transverse core location will be located so that the edge of the core will be no closer than 75 mm (3 in.) from a confined edge or 150 mm (6 in.) from a non-confined edge of the course being placed. The maximum specific gravity will be determined from the sample obtained in 401.09.

The Contractor shall obtain cores in the presence of the Engineer with a device that shall produce a uniform 150 mm (6 in.) diameter pavement sample. Coring shall be completed prior to the random location being covered by the next course. Surface courses shall be cored within two work days of placement. Damaged core(s) shall be discarded and replaced with a core from a location selected by adding 0.3 m (1.0 ft) to the longitudinal location of the damaged core using the same transverse offset.

The Contractor and the Engineer shall mark the core to define the course to be tested. If the core indicates a course thickness of less than 2.0 times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing.

The Engineer will take immediate possession of the cores. If the Engineer's cores are subsequently damaged, additional coring will be the responsibility of the Department. Subsequent core locations will be determined by subtracting 0.3 m (1.0 ft) from the random location using the same transverse offset.

The density for the mixture will be expressed as the percentage of maximum specific gravity (%MSG) obtained by dividing the average bulk specific gravity by the maximum specific gravity for the subplot, times 100. The Engineer will determine the BSG of the cores in accordance with AASHTO T 166. The maximum specific gravity will be determined in accordance with AASHTO T 209 from samples prepared in accordance with ITM 572. The target value for density of dense graded mixtures of each subplot shall be 92.0%.

Within one work day of coring operations the Contractor shall clean, dry, and refill the core holes with HMA of similar or smaller size particles or other approved materials.

The test results for each subplot shall meet the requirements for the tolerances as shown in the table below:

DENSE GRADED ACCEPTANCE TOLERANCE	
Core Density	94.0 ± 2.0 %MSG

Pay factors will be determined in accordance with 401.19(b).

The Engineer's acceptance test results for each subplot will be available when the testing is complete. Acceptance of the pavement for density (%MSG) will be reported to the nearest 0.1%. Rounding will be in accordance with 109.01(a).

401.17 Shoulder Corrugations. Shoulder corrugations shall be in accordance with 606.

401.18 Pavement Smoothness. The pavement smoothness will be accepted by means of a profilograph, a 4.9 m (16 ft) long straightedge, or a 3 m (10 ft) long straightedge.

The profilograph shall be used where the following conditions are met:

- (a) the design speed is greater than 70 km/h (45 mph),
- (b) the pavement lanes are full width and 75 m (250 ft) or longer, and
- (c) the HMA is placed on a milled surface or the total planned lay rate is 180 kg/m² (330 lb/syd) or greater.

If a pay item, Profilograph, is included in the contract, the Contractor shall furnish, calibrate, and operate an approved profilograph in accordance with ITM 901. The profilogram produced shall become the property of the Department. The profilograph shall remain the property of the Contractor. When a profilograph is not included as a pay item, the Department will furnish, calibrate, and operate the profilograph.

The 4.9 m (16 ft) long straightedge shall be used on overlays where the profilograph is not specified. The 4.9 m (16 ft) long straightedge shall be used on all full width pavement lanes shorter than 75 m (250 ft), on tapers, within 15 m (50 ft) of bridge ends, and within 15 m (50 ft) of an existing pavement, which is being joined.

The 3 m (10 ft) long straightedge shall be used for transverse slopes, approaches, and crossovers.

All wavelike irregularities and abrupt changes in profile caused by paving operations shall be corrected.

Each finished course of base and intermediate shall be subject to approval. The pavement smoothness shall be checked on any new intermediate course located immediately below a surface course and the surface course at the locations as designated in ITM 901.

If grinding of the intermediate course is used for pavement smoothness corrections, the grinding shall not precede the surface placement by more than 30 calendar days if open to traffic.

When the 4.9 m (16 ft) straightedge is used on a surface course, the pavement variations shall be corrected to 6 mm (1/4 in.) or less. When the 3 m (10 ft) straightedge is used, the pavement variations shall be corrected to 3 mm (1/8 in.) or less.

When the profilograph is being used on a surface course, in addition to the requirements for the profile index, all areas having a high or low point deviation in excess of 8 mm (0.3 in.) shall be corrected. Courses underlying the surface courses that are exposed by corrective actions shall be milled to 25 mm (1 in.) and replaced with surface materials. The initial profile index shall be determined prior to any corrective action. The final profile index will be determined after all corrective action has been completed.

When the profilograph is being used on an intermediate course, all areas having a high or low point deviation in excess of 8 mm (0.3 in.) shall be corrected. When the 4.9 m (16 ft) or 3.0 m (10 ft) straightedge is being used on an intermediate course, all areas having a high or low point deviation in excess of 6 mm (1/4 in.) shall be corrected.

401.19 Pay Factors. *A composite pay factor for each subplot based on test results for mixture properties and density is determined in a weighted formula as follows:*

$$SCPF = 0.20(PF_{BINDER}) + 0.35(PF_{VOIDS}) + 0.10(PF_{VMA}) + 0.35(PF_{DENSITY})$$

where:

SCPF = Sublot Composite Pay Factor for Mixture and Density
PF_{BINDER} = Sublot Pay Factor for Binder Content
PF_{VOIDS} = Sublot Pay Factor for Air Voids at N_{des}
PF_{VMA} = Sublot Pay Factor for VMA at N_{des}
PF_{DENSITY} = Sublot Pay Factor for Density

If the SCPF for a subplot is less than 0.85, the Materials and Tests Division will evaluate the pavement. If the Contractor is not required to remove the mixture, quality assurance adjustments of the subplot will be assessed or other corrective actions taken as determined by the Materials and Tests Division.

The quality assurance adjustment for mixture properties and density is calculated as follows.

$$q = \Sigma L \times U \times (SCPF - 1.00)$$

where:

- q = quality assurance adjustment quantity
 L = subplot quantity
 U = unit price for the material, \$/Mg (\$/TON)
 $SCPF$ = subplot composite pay factor

The quality assurance adjustment points for smoothness will be calculated in accordance with 401.19(c).

The total quality assurance adjustments is to be calculated as follows:

$$Q = Q_s + (\Sigma q)/MAF$$

where:

- Q = total quality assurance adjustment quantity
 Q_s = quality assurance adjustment for smoothness as calculated in 401.19(c)
 q = quality assurance adjustment quantity

(a) Mixture. Sublot test results for mixture properties will be assigned pay factors in accordance with the following.

BINDER CONTENT	
Pay Factor	Deviation from JMF (\pm %)
1.05	≤ 0.2
1.04	> 0.2 and ≤ 0.3
1.02	> 0.3 and ≤ 0.4
1.00	> 0.4 and ≤ 0.5
0.95	> 0.5 and ≤ 0.6
0.90	> 0.6 and ≤ 0.7
0.85	> 0.7 and ≤ 0.8
0.85 – 0.05 per each 0.1% over 0.8%	> 0.8

<i>VMA</i>	
<i>Pay Factor</i>	<i>Deviation from JMF (\pm %)</i>
<i>DENSE GRADED</i>	
<i>1.05</i>	≤ 0.5
<i>1.00</i>	$> 0.5 \text{ and } \leq 1.0$
<i>0.95</i>	$> 1.0 \text{ and } \leq 1.5$
<i>0.90</i>	$> 1.5 \text{ and } \leq 2.0$
<i>0.85</i>	$> 2.0 \text{ and } \leq 2.5$
<i>0.85 – 0.02 per each 0.1% over 2.5%</i>	> 2.5
<i>OPEN GRADED</i>	
<i>1.00</i>	<i>All</i>

<i>AIR VOIDS</i>	
<i>Pay Factor</i>	<i>Deviation from JMF (\pm %)</i>
<i>DENSE GRADED</i>	
<i>1.05</i>	≤ 0.5
<i>1.00</i>	$> 0.5 \text{ and } \leq 1.0$
<i>0.95</i>	$> 1.0 \text{ and } \leq 1.5$
<i>0.85</i>	$> 1.5 \text{ and } \leq 2.0$
<i>Submitted to the Materials and Tests Division *</i>	> 2.0
<i>OPEN GRADED</i>	
<i>1.05</i>	≤ 1.0
<i>1.00</i>	$> 1.0 \text{ and } \leq 3.0$
<i>0.95</i>	$> 3.0 \text{ and } \leq 3.5$
<i>0.85</i>	$> 3.5 \text{ and } \leq 4.0$
<i>Submitted to the Materials and Tests Division *</i>	> 4.0

* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.

For mixtures produced during a plant's adjustment period, pay factors based on the JMF with the above tolerances will be used to compute quality assurance adjustments.

(b) Density. Sublot test results for density will be assigned pay factors in accordance with the following:

Pay Factors– Percent	Percentages are based on %MSG	
	Dense Graded	Open Graded
<i>Submitted to the Materials and Tests Division *</i>	≥ 97.0	
<i>1.05 - 0.01 for each 0.1 % above 95.6</i>	95.6 – 96.9	
<i>1.05</i>	94.0 – 95.5	
<i>1.00 + 0.005 for each 0.1% above 93.1</i>	93.1 – 93.9	
<i>1.00</i>	92.0 – 93.0	84.0
<i>1.00 - 0.003 for each 0.1 % below 92.0</i>	91.0 – 91.9	
<i>0.97 - 0.012 for each 0.1 % below 91.0</i>	90.0 – 90.9	
<i>0.85 - 0.015 for each 0.1 % below 90.0</i>	89.0 – 89.9	
<i>Submitted to the Materials and Tests Division *</i>	≤ 88.9	

* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.

The pay factors shall be rounded to the nearest 0.01.

(c) Smoothness. When the pavement smoothness is tested with a profilograph, payment will be based on the final profile index in accordance with the following table. A Quality Assurance Pay Factor (PF_s) for smoothness will apply to the planned typical section including the aggregate base, and the HMA base, intermediate, and surface courses. The quality assurance adjustment for each section will include the total area of each pavement lane excluding shoulders for 0.16 km (0.1 mi) long section represented by the profile index calculated by the following formula:

$$q_s = (PF_s - 1.00) \sum_{i=1}^n \left(A \times \frac{S}{T} \times U \right)$$

where:

- q_s = quality assurance adjustment for smoothness for one section
- PF_s = pay factor for smoothness
- N = number of layers
- A = area of the section, m² (syd)
- S = spread rate for material, kg/m² (lb/syd)
- T = conversion factor: 1000 kg/Mg (2000 lb/ton)
- U = unit price for the material, \$/Mg (\$/ton)

The quality assurance adjustment for smoothness, Q_s , for the contract will be the total of the quality assurance adjustments for smoothness, q_s , on each section by the following formula:

$$Q_s = \sum q_s$$

<i>ADJUSTMENT FOR SMOOTHNESS</i>	
<i>Design Speed Greater Than 70 km/hr (45mph)</i>	
<i>Profile Index mm per 0.16 km (in./0.1 mi.)</i>	<i>Pay Factor</i>
<i>Over 0 to 5 mm (Over 0.00 to 0.20 in.)</i>	<i>1.05</i>
<i>Over 5 to 10 mm (Over 0.20 to 0.40 in.)</i>	<i>1.04</i>
<i>Over 10 to 20 mm (Over 0.40 to 0.80 in.)</i>	<i>1.02</i>
<i>Over 20 to 25 mm (Over 0.80 to 1.00 in.)</i>	<i>1.00</i>
<i>Over 25 to 28 mm (Over 1.00 to 1.10 in.)</i>	<i>0.96</i>
<i>Over 28 to 30 mm (Over 1.10 to 1.20 in.)</i>	<i>0.92</i>
<i>All pavement with a profile index greater than 30 mm (1.20 in.) shall be corrected.</i>	

Quality assurance pay factors greater than 1.00 will be applicable only to the initial measured profile index, prior to any corrective work. Quality assurance pay factors of 1.00 or less will be applied to pavement sections where corrective work has been completed.

401.20 Appeals. *If the QC test results do not agree with the acceptance test results, a request, along with the QC test results, may be made in writing for additional testing. Additional testing may be requested for one or more of the following tests: MSG, BSG of the gyratory specimens, binder content, or BSG of the density cores. The request for the appeal for MSG, BSG of gyratory specimens, binder content or BSG of the density cores shall be submitted within seven calendar days of receipt of the Department's written results for that lot. The lot, subplot and specific test(s) shall be specified at the time of the appeal. Upon approval of the appeal, the Engineer will perform additional testing as follows:*

The backup or new sample(s) will be tested in accordance with the applicable test method for the test requested.

(a) MSG. *The backup MSG sample will be dried in accordance with ITM 572 and tested in accordance with AASHTO T 209, Section 9.5.1.*

(b) BSG of the Gyratory Specimen. *New gyratory specimens will be prepared and tested in accordance with AASHTO T 312 from the backup sample.*

(c) Binder Content. The backup binder content sample will be prepared and tested in accordance with the test method that was used for acceptance.

(d) BSG of the Density Core. Additional cores shall be taken within seven calendar days unless otherwise directed. Additional core locations will be determined by adding 0.3 m (1.0 ft) longitudinally of the cores tested using the same transverse offset. The appeal density cores will be tested in accordance with AASHTO T 166.

The appeal results will replace all previous test result(s) for acceptance of mixture in accordance with 401.09 and density in accordance with 401.16. The results will be furnished to the Contractor.

401.21 Method of Measurement. HMA mixtures will be measured by the megagram (ton) of the type specified, in accordance with 109.01(b). The mass (weight) accepted for payment will be divided by the MAF to determine the accepted quantity.

Milled shoulder corrugations will be measured in accordance with 606.02.

401.22 Basis of Payment. The accepted quantities for this work will be paid for at the contract unit price per megagram (ton) for QC/QA-HMA, of the type specified, complete in place.

Payment for furnishing, calibrating, and operating the profilograph, and furnishing profile information will be made at the contract lump sum price for profilograph, HMA.

Adjustments to the contract payment with respect to mixture, density, and smoothness for mixture produced will be included in a quality assurance adjustment pay item. The unit price for this pay item will be one dollar (\$1.00) and the quantity will be in units of dollars. The quantity is the total calculated in accordance with 401.19. An extra work order developed in accordance with 109.05 will be prepared to reflect contract adjustments.

Milled shoulder corrugations will be paid for in accordance with 606.03.

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Profilograph, HMA.....	LS
QC/QA HMA, $\frac{\text{mm}}{(\text{ESAL}^{(1)}) (\text{PG}^{(2)}) (\text{Course}^{(3)}) (\text{Mix}^{(4)})}$	Mg (TON)
Quality Assurance Adjustment.....	DOL
(1) ESAL Category as defined in 401.04	
(2) Number represents the high temperature binder grade. Low temperature grades are -22.	
(3) Surface, Intermediate, or Base	
(4) Mixture Designation	

Preparation of surfaces to be overlaid shall be included in the cost of other pay items.

Coring and refilling of the core holes shall be included in the cost of other pay items within this section.

No payment will be made for additional anti-stripping additives, appeal coring or traffic control expenditures related to coring operations.

Corrections for pavement smoothness shall be included in the cost of other pay items within this section.

The price for Profilograph, HMA, will be full compensation regardless of how often the profilograph is used or how many profilograms are produced.

If QC/QA-HMA intermediate over QC/QA-HMA base mixtures are specified, QC/QA-HMA intermediate mixture may be permitted as a substitute for the QC/QA-HMA intermediate and QC/QA-HMA base mixtures upon a written request by the Contractor. The request for the substitution shall be prepared in advance of the work. A computation will be made in order to obtain a unit price for the QC/QA-HMA intermediate mixture. The quantity and amount for QC/QA-HMA intermediate mixture shall equal the sum of the contract quantities and amounts shown for QC/QA-HMA intermediate and QC/QA-HMA base mixtures. The unit price for QC/QA-HMA intermediate mixture shall be equal to the sum of contract amounts divided by the sum of contract quantities. Payment for the QC/QA-HMA intermediate mixture will be made at the unit price per megagram (ton) for QC/QA-HMA intermediate mixture. No payment will be made for additional work or costs which may result due to this change.

SECTION 402, DELETE LINES 1 THROUGH 451:

SECTION 402, AFTER LINE 452 INSERT AS FOLLOWS:

SECTION 402 – HOT MIX ASPHALT, HMA, PAVEMENT

402.01 Description. *This work shall consist of one or more courses of HMA base, intermediate, or surface mixtures and miscellaneous courses for rumble strips, and wedge and leveling constructed on prepared foundations in accordance with 105.03.*

402.02 Quality Control. *The HMA shall be supplied from a certified HMA plant in accordance with ITM 583; Certified Volumetric Hot Mix Asphalt Producer Program. The HMA shall be transported and placed according to a Quality Control Plan, QCP, prepared and submitted by the Contractor in accordance with ITM 803; Contractor Quality Control Plans for Hot Mix Asphalt Pavements. The QCP shall be submitted to the Engineer at least 15 days prior to commencing HMA paving operations.*

MATERIALS

402.03 Materials. *Materials shall be in accordance with the following:*

*Asphalt Materials**PG Binder, PG 58-28*, PG 64-22,**PG 64-28*, PG 70-22902.01(a)**Coarse Aggregates904**Base Mixtures - Class D or Higher**Intermediate Mixtures - Class C or Higher**** Surface Mixtures - Class B or Higher**Aggregates904*** Only for use in mixtures containing greater than 15% RAP. Refer to 402.05.**** Surface aggregate requirements are listed in 904.03(d).*

402.04 Design Mix Formula. A DMF shall be prepared in accordance with 402.05 and submitted in a format acceptable to the Engineer one week prior to use. The DMF shall state the maximum particle size in the mixture, the calibration factor and test temperature to be used for the determination of binder content using ITM 586, or ITM 571, and a MAF. Approval of the DMF will be based on the ESAL and mixture designation as follows.

<i>Mixture Type</i>	<i>Type A</i>	<i>Type B</i>	<i>Type C</i>	<i>Type D</i>
<i>Design ESAL</i>	<i>200,000</i>	<i>2,000,000</i>	<i>9,000,000</i>	<i>11,000,000</i>
<i>Surface</i>	<i>9.5 mm</i>	<i>9.5 mm</i>	<i>9.5 mm</i>	<i>9.5 mm</i>
<i>Surface - PG Binder</i>	<i>64-22</i>	<i>64-22</i>	<i>70-22</i>	<i>70-22</i>
<i>Intermediate</i>	<i>19.0 mm</i>	<i>19.0 mm</i>	<i>19.0 mm</i>	<i>19.0 mm</i>
<i>Intermediate- PG Binder</i>	<i>64-22</i>	<i>64-22</i>	<i>64-22</i>	<i>70-22</i>
<i>Base</i>	<i>25.0 mm</i>	<i>25.0 mm</i>	<i>25.0 mm</i>	<i>25.0 mm</i>
<i>Base - PG Binder</i>	<i>64-22</i>	<i>64-22</i>	<i>64-22</i>	<i>64-22</i>

The Engineer will assign a mixture number. No mixture will be accepted until the DMF has been approved.

402.05 Volumetric Mix Design The DMF shall be determined for each mixture from a volumetric mix design in accordance with 401.05.

A DMF developed for a QC/QA HMA mixture may be used and the source or grade of the binder may be changed; however, the high temperature grade shall meet the minimum requirements of 402.04.

The MAF equals the Gmm from the mixture design divided by the following: 2.465 for 9.5 mm mixtures and 2.500 for 12.5 mm, 19.0 mm, and 25.0 mm mixtures. If the MAF calculation results in a value where $0.960 \leq \text{MAF} \leq 1.040$, then the MAF shall be considered to be 1.000. If the calculated MAF is outside of the above range, then the actual calculated value shall be used.

402.06 Job Mix Formula. *The job mix formula, JMF, shall be an approved JMF in accordance with 401.08 of the same gyratory compaction effort ESAL category or higher, and submitted in a format acceptable to the Engineer and shall use the same MAF as the DMF. The JMF shall state the maximum particle size in the mixture and the calibration factor and test temperature to be used for the determination of binder content using the ignition oven. Approval of the JMF will be based on the ESAL and mixture designation. No mixture will be accepted until the JMF has been approved.*

All changes in the type or source of aggregate shall require the submittal of a new DMF for approval.

For mixtures containing 0.0% to 15.0% RAP, changes in the source and grade of specified binders will be permitted; however the high temperature grade shall meet the minimum requirements of 402.04.

402.07 Mix Criteria.

(a) Composition Limits for HMA Rumble Strip Mixtures. *Rumble strip mixtures shall be a type A surface in accordance with 402.04. A MAF in accordance with 402.05 will not apply. Aggregate requirements of 904.03(d) do not apply.*

(b) Composition Limits for HMA Wedge and Leveling Mixtures. *The mixture shall consist of surface or intermediate mixtures in accordance with 402.04. Aggregate requirements of 904.03(d) do not apply when the wedge and leveling mixture is covered by a surface or intermediate mixture.*

(c) Composition Limits for Temporary HMA Mixtures. *Temporary HMA mixtures shall be type B in accordance with 402.04. A MAF in accordance with 402.05 will not apply.*

402.08 Recycled Materials. *Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 50 mm (2 in.) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.*

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25.0% by mass (weight) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 5.0% by mass (weight) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the JMF.

Recycled materials may be used in all mixtures except type C and type D surface mixtures.

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 402.03.

The binder low temperature classification for mixtures containing greater than 15.0% and up to 25.0% RAP shall be -28°C, and the binder high temperature classification may be reduced by 6°C.

402.09 Acceptance of Mixtures. *Acceptance of mixtures will be in accordance with the Frequency Manual on the basis of a type D certification in accordance with 916. The test results shown on the certification shall be the quality control tests representing the material supplied and include air voids and binder content. Air voids tolerance shall be $\pm 1.5\%$ and binder content tolerance shall be $\pm 0.7\%$ from DMF or JMF.*

Single test values and averages will be reported to the nearest 0.1%. Rounding will be in accordance with 109.01(a).

Test results exceeding the tolerance limits will be considered as a failed material and adjudicated in accordance with 105.03.

CONSTRUCTION REQUIREMENTS

402.10 General. *Equipment for HMA operations shall be in accordance with 409.*

Fuel oil, kerosene, or solvents shall not be transported in open containers on any equipment at any time. Cleaning of equipment and tools shall not be accomplished on the pavement or shoulder areas.

Segregation, flushing or bleeding of HMA mixtures will not be permitted. Corrective action shall be taken to prevent continuation of these conditions. Areas of segregation, flushing or bleeding shall be corrected, if directed. All areas showing an excess or deficiency of asphalt materials shall be removed and replaced.

All mixtures that become loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced.

Mixture shall not be dispatched from the plant that cannot be spread and compacted before sundown of that day, unless otherwise permitted.

402.11 Preparation of Surfaces to be Overlaid. *The subgrade shall be shaped to the required grade and sections, free from all ruts, corrugations, or other irregularities, and uniformly compacted and approved in accordance with 207. Milling of an existing surface shall be in accordance with 202.05. Surfaces on which a mixture is placed shall be free from objectionable or foreign materials at the time of placement.*

Compacted aggregate bases and rubblized bases shall be primed in accordance with 405. PCCP, milled asphalt surfaces, and asphalt surfaces shall be tacked in accordance with 406. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

402.12 Weather Limitations. *HMA courses less than 60 kg/m² (110 lb/syd) are to be placed when the ambient and surface temperatures are 16°C (60°F) or above. HMA courses equal to or greater than 60 kg/m² (110 lb/syd) but less than 120 kg/m² (220 lb/syd) are to be placed when the ambient and surface temperatures are 7°C (45°F) or above. HMA courses equal to or greater than 120 kg/m² (220 lb/syd) and HMA curbing are to be placed when the ambient and surface temperatures are 0°C (32°F) or above. Mixture shall not be placed on a frozen subgrade. However, HMA courses may be placed at lower temperatures, provided the density of the HMA course is in accordance with 402.16.*

All partially completed sections of roadway that are 200 mm (8 in.) or less in thickness shall be proofrolled prior to the placement of additional materials the following spring. Proofrolling shall be accomplished in accordance with 203.26. The contact pressure shall be 480 to 550 kPa (70 to 80 psi). Soft yielding areas shall be removed and replaced.

402.13 Spreading and Finishing. *The mixture shall be placed upon an approved surface by means of laydown equipment in accordance with 409.03(c). Prior to paving, both the planned quantity and lay rate shall be adjusted by multiplying by the MAF. When mixture is produced from more than one DMF or JMF for a given pay item, the MAF will be applied to the applicable portion of the mixture for each. Mixtures in areas inaccessible to laydown equipment or mechanical devices may be placed by other methods.*

The temperature of each mixture at the time of spreading shall not be more than 10°C (18°F) below the minimum mixing temperature as shown on the DMF or JMF.

Planned HMA courses greater than 90 kg/m² (165 lb/syd) placed under traffic shall be brought up even with each adjacent lane at the end of each work day. Planned HMA courses less than or equal to 90 kg/m² (165 lb/syd) shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane. Traffic shall not be allowed on open graded mixtures.

Hydraulic extensions on the paver will not be permitted for continuous paving operations. Fixed extensions or extendable screeds shall be used on courses greater than the nominal width of the paver except in areas where the paving widths vary. Hydraulic extensions may be used on approaches, tapers, and added lanes less than 75 m (250 ft) in length.

HMA shoulders which are 2.4 m (8.0 ft) or more in width shall be placed with automatic paving equipment.

HMA mixtures in hauling equipment shall be protected by tarps from adverse weather conditions or foreign materials. Adverse weather conditions include, but will not be limited to, precipitation or temperatures below 7°C (45°F).

The speed of the paver shall not exceed 15 m (50 ft) per min when spreading mixtures.

Automatic slope and grade controls shall be required except when placing mixtures on roadway approaches which are less than 60 m (200 ft) in length or on miscellaneous work. The use of automatic controls on other courses where use is impractical due to project conditions may be waived by the Engineer.

The finished thickness of each course shall be at least two times but not more than four times the maximum particle size as shown on the DMF or JMF. Feathering may be less than the minimum thickness requirements.

Rumble strips shall be placed to ensure uniformity of depth, width, texture, and the required spacing between strips. A tack coat in accordance with 406 shall be applied on the pavement surface prior to placing the mixture. The tack coat may be applied with a paint brush or other approved methods.

402.14 Joints. *Longitudinal joints in the surface shall be at the lane lines of the pavement. Longitudinal joints below the surface shall be offset from previously constructed joints by approximately 150 mm (6 in.), and be located within 300 mm (12 in.) of the lane line.*

Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course.

If constructed under traffic, temporary transverse joints shall be feathered to provide a smooth transition to the driving surface.

402.15 Compaction. *The HMA mixture shall be compacted with equipment in accordance with 409.03(d) immediately after the mixture has been spread and finished. Rollers shall not cause undue displacement, cracking, or shoving.*

A roller application is defined as one pass of the roller over the entire mat. Compaction operations shall be completed in accordance with one of the following options:

Rollers	Number of Roller Applications					
	Courses $\leq 240 \text{ kg/m}^2$ (440 lb/syd)				Courses $> 240 \text{ kg/m}^2$ (440 lb/syd)	
	Option 1	Option 2	Option 3	Option 4	Option 1	Option 2
Three Wheel	2		4		4	
Pneumatic Tire	2	4			4	
Tandem	2	2	2		4	
Vibratory Roller				6		8

A reduced number of applications on a course may be approved if detrimental results are being observed.

Compaction equipment shall be operated with the drive roll or wheels nearest the paver and at speeds not to exceed 4.5 km/h (3 mph). However, vibratory rollers will be limited to 4 km/h (2.5 mph). Rolling shall be continued until applications are completed and all roller marks are eliminated.

Compaction operations shall begin at the low side and proceed to the high side of the mat. The heaviest roller wheel shall overlap its previous pass by a minimum of 150 mm (6 in.).

Longitudinal joints shall be compacted in accordance with the following:

- (a) For confined edges, the first pass adjacent to the confined edge, the compaction equipment shall be entirely on the hot mat 150 mm (6 in.) from the confined edge.*
- (b) For unconfined edges, the compaction equipment shall extend 150 mm (6 in.) beyond the edge of the hot mat.*

All displacement of the HMA mixture shall be corrected at once by the use of lutes and/or the addition of fresh mixture as required. The line and grade of the edges of the HMA mixture shall not be displaced during rolling.

The wheels shall be kept properly moistened with water or water with detergent to prevent adhesion of the materials to the wheels.

Areas inaccessible to rollers shall be compacted thoroughly with hand tampers or other mechanical devices in accordance with 409.03(d)6 to achieve the required compaction. A trench roller, in accordance with 409.03(d)5, may be used to obtain compaction in depressed areas.

The final two roller applications shall be completed at the highest temperature where the mixture does not exhibit any tenderness.

Vehicular traffic will not be permitted on a course until the mixture has cooled sufficiently to prevent distortions.

Rumble strips shall be compacted with vibratory compacting equipment in accordance with 409.03(d)6 unless otherwise stated.

402.16 Low Temperature Density Requirements. *Compaction for mixtures placed below the temperatures listed in 402.12, shall be controlled by air voids determined from a mixture plate sample and cores cut from the compacted pavement placed during a low temperature period. Samples shall be obtained in accordance with ITM 580. Acceptance will be based on a minimum of one plate sample and two cores. The Engineer will randomly select locations in accordance with ITM 802. The transverse core location will be located so that the edge of the core will be no closer than 75 mm (3 in.) from a confined edge or 150 mm (6 in.) from a non-confined edge of the course being placed.*

For compaction of HMA during low temperature periods with quantities less than 100 Mg (100 t) per day, acceptance may be visual.

The Contractor shall obtain cores in the presence of the Engineer with a device that shall produce a uniform 150 mm (6 in.) diameter pavement sample. Coring shall be completed prior to the random location being covered. The final HMA course shall be cored within one work day of placement. Damaged core(s) shall be discarded and replaced with a core from a location selected by adding 0.3 m (1.0 ft) to the longitudinal location of the damaged core using the same transverse offset.

The Contractor, and the Engineer, shall mark the core to define the course to be tested. If the core indicates a course thickness of less than 2.0 times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing.

The Engineer will take immediate possession of the cores. If the Engineer's cores are subsequently damaged, additional coring within a specific section will be the responsibility of the Department. Subsequent core locations will be determined by subtracting 0.3 m (1.0 ft) from the random location using the same transverse offset.

The percent air voids of a section for the mixture shall be expressed as:

$$AV \% = (1.0 - BSG/MSG) \times 100$$

where:

AV % = percent air voids

BSG = average bulk specific gravity

MSG = maximum specific gravity

The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166. The maximum specific gravity will be determined in accordance with AASHTO T 209. Air voids shall not be greater than 8.0%. Within one work day of coring operations, the Contractor shall clean, dry, refill, and compact the core holes with suitable HMA of similar or smaller size particles or other approved materials.

402.17 Shoulder Corrugations. *Shoulder corrugations shall be in accordance with 606.*

402.18 Pavement Smoothness. *Pavement smoothness will be in accordance with 401.18 except profilograph requirements will not apply.*

402.19 Method of Measurement. *HMA mixtures will be measured by the megagram (ton) of the type specified, in accordance with 109.01(b). The mass (weight) accepted for payment will be divided by the MAF to determine the accepted quantity.*

HMA rumble strips will be measured by the meter (linear foot) of each transverse strip, complete in place.

Milled shoulder corrugations will be measured in accordance with 606.02.

402.20 Basis of Payment. *The accepted quantities for this work will be paid for at the contract unit price per megagram (ton) for HMA, of the type specified complete in place.*

HMA rumble strips will be paid for at the contract unit price per meter (linear foot), of each transverse strip complete in place.

Milled shoulder corrugations will be paid for in accordance with 606.03.

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
HMA Surface, Type <u> </u> *	Mg(TON)
HMA Intermediate, Type <u> </u> *	Mg(TON)
HMA Base, Type <u> </u> *	Mg(TON)
HMA Rumble Strips	m (LFT)
HMA for Temporary Pavement	Mg (TON)
HMA Wedge and Level, Type <u> </u> *	Mg (TON)
* Mixture Type	

Preparation of surfaces to be overlaid shall be included in the cost of other pay items in this section.

No payment will be made for additional anti-stripping additives.

The cost of removing and replacing soft yielding areas discovered by proofrolling shall be included in the cost of other pay items in this section.

No payment will be made for coring operations and related traffic control expenditures required in 402.16.

Corrections for pavement smoothness including removal and replacement of pavement, shall be included in the cost of other pay items in this section.

If HMA intermediate over HMA base mixtures are specified, HMA intermediate may be permitted as a substitute for the HMA intermediate and HMA base mixtures upon a written request by the Contractor. The request for the substitution shall be prepared in advance of the work. A computation will be made in order to obtain a unit price for the HMA intermediate. The quantity and amount for HMA intermediate shall equal the sum of the contract quantities and amounts shown for HMA intermediate and HMA base mixtures. The unit price for HMA intermediate shall be equal to the sum of contract amounts divided by the sum of contract quantities. Payment for the HMA intermediate will be made at the unit price per megagram (ton) for HMA intermediate. No payment will be made for additional work or cost which may result due to this change.

SECTION 403, DELETE LINES 1 THROUGH 83.

SECTION 403, AFTER LINE 84 INSERT AS FOLLOWS:

SECTION 403 – COLD MIX ASPHALT, CMA, PAVEMENT

403.01 Description. *This work shall consist of the construction of one or more courses of CMA base, intermediate, or surface for immediate use or stockpiled in accordance with 105.03.*

MATERIALS

403.02 Materials. *Materials shall be in accordance with the following:*

<i>Asphalt Materials</i>	
<i>For Immediate Use,</i>	
<i>Asphalt Emulsion AE-150, AE-90</i>	<i>902.01(b)</i>
<i>For Stockpiling, Asphalt Emulsion, AE-150</i>	<i>902.01(b)</i>
<i>Coarse Aggregates</i>	<i>904</i>
<i>Base, Class D or Higher</i>	
<i>Intermediate, Class C or Higher</i>	
<i>Surface, Class B or Higher</i>	
<i>Fine Aggregates</i>	<i>904</i>

CONSTRUCTION REQUIREMENTS

403.03 Weather Limitations. *CMA pavements shall not be placed on a wet surface, when the ambient temperature is below 4°C (40°F), or when other unsuitable conditions exist, unless approved by the Engineer.*

403.04 Equipment. *Mixing plant, hauling trucks, pavers, and rollers shall be in accordance with 409.*

403.05 Preparation of Mixtures. *The size of the aggregate and the grade of asphalt materials shall be as specified. The gradations and percent of asphalt shall be as follows:*

<i>Composition Limits for CMA Mixtures</i>						
<i>Sieve Size</i>	<i>Total Percent of Aggregates Passing Sieves Based on Total Mass (Weight) of Aggregates</i>					
	<i>Size 2</i>	<i>Size 5</i>	<i>Size 8</i>	<i>Size 9</i>	<i>Size 11</i>	<i>Size 5D</i>
<i>63 mm (2.5 in.)</i>	<i>100</i>					
<i>50 mm (2 in.)</i>	<i>95-100</i>					
<i>37.5 mm (1.5 in.)</i>		<i>100</i>				<i>100</i>
<i>25.0 mm (1 in.)</i>	<i>0-25</i>	<i>85-100</i>	<i>100</i>			<i>80-99</i>
<i>19.0 mm (3/4 in.)</i>	<i>0-10</i>	<i>60-90</i>	<i>75-100</i>	<i>100</i>		<i>68-90</i>
<i>12.5 mm (1/2 in.)</i>	<i>0-7</i>	<i>30-65</i>	<i>40-75</i>	<i>65-90</i>	<i>100</i>	<i>54-76</i>
<i>9.5 mm (3/8 in.)</i>		<i>15-50</i>	<i>20-55</i>	<i>30-65</i>	<i>75-100</i>	<i>45-67</i>
<i>4.75 mm (No. 4)</i>		<i>0-20</i>	<i>0-20</i>	<i>0-20</i>	<i>10-35</i>	<i>30-50</i>
<i>2.36 mm (No. 8)</i>		<i>0-15</i>	<i>0-15</i>	<i>0-15</i>	<i>0-15</i>	<i>20-45</i>
<i>600 μm (No. 30)</i>						<i>7-28</i>
<i>75 μm (No. 200)</i>	<i>0-5</i>	<i>0-5</i>	<i>0-5</i>	<i>0-6</i>	<i>0-6</i>	<i>0-6</i>
<i>Minimum Percent Crushed</i>	<i>95</i>	<i>95</i>	<i>95</i>	<i>95</i>	<i>95</i>	<i>95</i>
<i>Percent of Asphalt*</i>	<i>2.0-3.5</i>	<i>2.5-4.0</i>	<i>3.0-4.5</i>	<i>3.5-5.0</i>	<i>4.0-6.0</i>	<i>3.5-5.0</i>

* Percent of asphalt shall be calculated on the basis of the total mass (weight) of the mixture, exclusive of water or solvent. When slag is used, the asphalt content will be adjusted to compensate for the specific gravity and surface area.

The moisture condition of the aggregate shall be such that the aggregate is uniformly coated and satisfactorily retains the required amount of asphalt during the stockpiling, hauling, and spreading operations. Mixtures shall not be produced at temperatures exceeding 80°C (180°F).

403.06 Preparation of Subgrade or Base. Mixtures for CMA base may be placed on an earth subgrade, on an existing pavement surface to be used as a base, or on a previously prepared base or subbase as specified. If such material is to be laid on a newly prepared subgrade, then all applicable requirements of 207 shall apply.

403.07 Spreading Mixture. The CMA mixture shall be spread in accordance with 402.13.

403.08 Curing. All CMA mixtures shall be allowed to cure sufficiently to prevent undue distortions under the roller wheels.

When a CMA mixture is allowed to cure under traffic, the surface shall be maintained and all damaged areas shall be satisfactorily repaired.

403.09 Compaction. Compaction shall be in accordance with 402.15. Satisfactory means to confine the mixture within the required limits shall be in place during the compaction operation.

403.10 Surface Tolerances. The smoothness requirements for CMA pavements shall be in accordance with 402.18.

403.11 Method of Measurement. CMA pavement will be measured by the megagram (ton), of the type and size specified, in accordance with 109.01(b).

403.12 Basis of Payment. The accepted quantities of CMA pavement will be paid for at the contract unit price per megagram (ton), of the type and size specified, for the mixture.

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
CMA Base _____ size	Mg (TON)
CMA Intermediate _____ size	Mg (TON)
CMA Surface _____ size	Mg (TON)

The cost of repairing damaged areas of mixture allowed to cure under traffic shall be included in the cost of the pay items in this section.

SECTION 404, DELETE LINES 1 THROUGH 108

SECTION 404, AFTER LINE 109 INSERT AS FOLLOWS:

SECTION 404 -- SEAL COAT

404.01 Description. This work shall consist of one or more applications of asphalt material, each followed by an application of cover aggregate in accordance with 105.03.

MATERIALS

404.02 Asphalt Material. The type and grade of asphalt material shall in accordance with the following:

Asphalt Emulsion, RS-2, AE-90, AE-90S, or HFRS-2.....902.01(b)

404.03 Cover Aggregate. Aggregate shall be in accordance with the following requirements. When slag is used as an alternate to natural aggregate, adjustments will be made in accordance with 904.01, to compensate for differences in specific gravity.

Coarse Aggregates, Class B or Higher
Size No. 8, 9, 11, or 12.....904
Fine Aggregate
Size No. 23 or 24.....904

The types of seal coats shall be as follows:

TYPE	APPLICATION	COVER AGGREGATE SIZE NO.	RATES OF APPLICATION PER SQUARE METER (SQUARE YARD)	
			AGGREGATE kg (lb)	ASPHALT MATERIAL LITER (GALLON) AT 16°C (60°F)
1*	Single	23, 24	5.4-6.8 (12-15)	0.45-0.61 (0.12-0.16)
2	Single	12	6.4-7.7 (14-17)	1.09-1.25 (0.29-0.33)
3	Single	11	7.3-9.1 (16-20)	1.36-1.51 (0.36-0.40)
4	Single	9	12.7-14.5 (28-32)	2.38-2.57 (0.63-0.68)
5	Double	a. 11	7.3-9.1 (16-20)	1.36-1.51 (0.36-0.40)
		b. 12	7.3-8.6 (16-19)	1.25-1.40 (0.33-0.37)
6	Double	a. 9	12.7-14.5 (28-32)	2.38-2.57 (0.63-0.68)
		b. 11	8.2-10.0 (18-22)	1.55-1.74 (0.41-0.46)
7	Double	a. 8	12.7-14.5 (28-32)	2.38-2.57 (0.63-0.68)
		b. 11	8.2-10.0 (18-22)	1.55-1.74 (0.41-0.46)

* Only AE-90 or AE-150 shall be used for seal coat, type 1.

CONSTRUCTION REQUIREMENTS

404.04 Weather Limitations. Asphalt material shall not be applied on a wet surface, or when other weather conditions would adversely affect the seal coats. Seal coats shall not be placed when the ambient or base temperature is below 4°C (40°F). If seal coats are placed when the ambient or base temperature is between 4°C (40°F) and 16°C (60°F), the cover aggregate shall be heated to between 49°C (120°F) and 66°C (150°F).

404.05 Equipment. A distributor, rotary power broom, pneumatic tire roller, and aggregate spreader in accordance with 409.03, shall be used.

404.06 Preparation of Surface. Surfaces to be sealed shall be brought to proper section and grade, compacted, cleaned as required, and approved. Aggregate surfaces to be sealed shall be primed in accordance with 406.

404.07 Applying Asphalt Material. *Asphalt material shall be applied in a uniform continuous spread over the section to be treated. The quantity of asphalt material to be applied per square meter (square yard) shall be as directed.*

The asphalt material shall not be spread over a greater area than that which can be covered with the cover aggregate that is in trucks at the site. It shall not be spread more than 150 m (500 ft) ahead of the aggregate spreader.

The spread of the asphalt material shall be no wider than the width covered by the cover aggregate from the spreading device. Operations shall not proceed such that asphalt material is allowed to chill, set up, dry, or otherwise impair retention of the cover coat.

404.08 Application of Cover Aggregate. *Immediately following the application of the asphalt material, cover aggregate shall be spread in quantities as directed. Spreading shall be accomplished such that the tires of the trucks or aggregate spreader do not contact the uncovered and newly applied asphalt material.*

Rolling shall consist of at least three complete roller coverages and be completed within 30 min after the cover aggregate is applied. The rollers shall not be operated at speeds that will displace the cover aggregate from the asphalt material.

The seal coat shall be protected by the restriction of traffic or by controlling traffic speed until the asphalt material has cured or set sufficiently to hold the cover aggregate without displacement.

Excess cover aggregate shall be removed from the pavement surface by light brooming on the day following placement of the seal coat. The brooming shall not displace the imbedded cover aggregate.

404.09 Method of Measurement. *Asphalt material and cover aggregate will be measured by the megagram (ton). Seal coat will be measured by the square meter (square yard).*

If measurement of seal coat is made by the square meter (square yard), the quantity for each day's placement will be the least of the following:

- (a) the measured square meters (square yards) within the specified limits;*
- (b) the calculated square meters (square yards) based on the amount of aggregate used, divided by the minimum amount of aggregate per square meter (square yard) specified in 404.03; or*
- (c) the calculated square meters (square yards) based on the amount of asphalt material used, divided by the minimum amount of asphalt material per square meter (square yard) specified in 404.03.*

404.10 Basis of Payment. *The accepted quantities of asphalt material and cover aggregate will be paid for at the contract unit price per megagram (ton). Seal coat will be paid for at the contract unit price per square meter (square yard) complete in place. If slag is used as a cover aggregate, and payment will be made per megagram (ton), the pay quantity will be adjusted in accordance with 904.01.*

If seal coat is paid for by the square meter (square yard) and if so directed, asphalt material in excess of the limits set out in 404.03 will be paid for at the Contractor's invoice price, plus 20%.

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Asphalt for Seal Coat	Mg (TON)
Cover Aggregate, Seal Coat	Mg (TON)
Seal Coat, _____ type	m2 (SYS)

SECTION 405, DELETE LINES 1 THROUGH 61.

SECTION 405, AFTER LINE 62 INSERT AS FOLLOWS:

SECTION 405 – PRIME COAT

405.01 Description. *This work shall consist of preparing and treating an existing or newly constructed aggregate surface or rubblized PCCP with asphalt material and cover aggregate in accordance with 105.03.*

MATERIALS

405.02 Asphalt Material. *The type and grade of asphalt material shall be in accordance with the following:*

Asphalt Emulsion, AE-PMP 902.01(b)

405.03 Cover Aggregate. *Aggregate shall be in accordance with the following:*

Coarse Aggregate, Class B or Higher,
Size No. 12 904
Fine Aggregate, Size No. 23 or 24 904

CONSTRUCTION REQUIREMENTS

405.04 Weather Limitations. *Asphalt material shall not be applied on a wet surface, when the ambient temperature is below 10°C (50°F), or when other unsuitable conditions exist, unless approved by the Engineer.*

405.05 Equipment. *A distributor and aggregate spreader in accordance with 409.03 shall be used.*

405.06 Preparation of Surface. *The existing surface to be treated shall be shaped to the required grade and section; free from all ruts, corrugations, or other irregularities; uniformly compacted; and approved.*

405.07 Application of Asphalt Material. *AE-PMP shall be uniformly applied at the rate of 2.2 to 3.3 L/m² (0.50 to 0.75 gal./syd) placed in a single application. When placing material on a rubblized base, a carpet drag shall be utilized behind the distributor.*

When traffic is to be maintained within the limits of the section, approximately half of the width of the section shall be treated in one application. Complete coverage of the section shall be ensured. Treated areas shall not be opened to traffic until the asphalt material has been absorbed.

405.08 Cover Aggregate. *If the asphalt material fails to penetrate and the primed surface must be used by traffic, cover aggregate shall be spread to provide a dry surface.*

405.09 Method of Measurement. *Asphalt for prime coat will be measured by the megagram (ton), or by the square meter (square yard). Cover aggregate will be measured by the megagram (ton).*

405.10 Basis of Payment. *The accepted quantities of prime coat will be paid for at the contract unit price per megagram (ton), or per square meter (square yard) for asphalt for prime coat. The accepted quantities of cover aggregate will be paid for at the contract unit price per megagram (ton), complete in place.*

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Asphalt for Prime Coat.....	Mg (TON) m2 (SYS)
Cover Aggregate, Prime Coat.....	Mg (TON)

SECTION 406, DELETE LINES 3 THROUGH 40.

SECTION 406, AFTER LINE 41 INSERT AS FOLLOWS:

SECTION 406 -- TACK COAT

406.01 Description. *This work shall consist of preparing and treating an existing pavement or concrete surface with asphalt material in accordance with 105.03.*

MATERIALS

406.02 Asphalt Material. *The type and grade of asphalt material shall be in accordance with the following:*

Emulsion, AE-T, AE-PMT.....	902.04(b)
PG Asphalt Binder, PG 64-22.....	902.01(a)

CONSTRUCTION REQUIREMENTS

406.03 Equipment. *A distributor in accordance with 409.03(a) shall be used.*

406.04 Preparation of Surface. *The existing surface to be treated shall be free of foreign materials deemed detrimental by the Engineer.*

406.05 Application of Asphalt Material. *The asphalt material shall be uniformly applied at the rate of from 0.14 to 0.36 L/m² (0.03 to 0.08 gal./syd), or as otherwise specified or directed.*

Tack coat shall not be applied to a wet surface. The rate of application, temperature, and areas to be treated shall be approved prior to application. Excessive tack coat shall be corrected to obtain an even distribution.

406.06 Method of Measurement. *Asphalt for tack coat will be measured by the megagram (ton) or by the square meter (square yard).*

406.07 Basis of Payment. *The accepted quantities of tack coat will be paid for at the contract unit price per megagram (ton), or per square meter (square yard) for asphalt for tack coat, complete in place.*

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Asphalt for Tack Coat.....	Mg (TON) m2 (SYS)

SECTION 407, DELETE LINES 3 THROUGH 43.

SECTION 407, AFTER LINE 44 INSERT AS FOLLOWS:

SECTION 407 -- DUST PALATIVE

407.01 Description. *This work shall consist of preparing and treating an existing aggregate surface with asphalt material in accordance with 105.03.*

MATERIALS

407.02 Asphalt Material. *The type and grade of asphalt material shall be in accordance with the following:*

Asphalt Emulsion, AE-PL.....902.01(b)

CONSTRUCTION REQUIREMENTS

407.03 Weather Limitations. *Asphalt material shall not be applied on a wet surface, when the ambient temperature is below 10°C (50°F), or when other unsuitable conditions exist, unless approved by the Engineer.*

407.04 Equipment. *A distributor in accordance with 409.03(a) shall be used.*

407.05 Preparation of Surface. *The surface to be treated shall be shaped to the required section, and be free from all ruts, corrugations, or other irregularities.*

407.06 Application of Asphalt Material. *The asphalt material shall be uniformly applied at the rate of 1.5 to 5 L/m² (0.25 to 1.00 gal./syd) in a uniform continuous spread over the section to be treated or as directed.*

When traffic is to be maintained within the limits of the section, approximately half of the width of the section shall be treated in one application. Complete coverage of the section shall be ensured. Treated areas shall not be opened to traffic until the asphalt material has been absorbed.

407.07 Method of Measurement. *Asphalt for dust palative will be measured by the megagram (ton).*

407.08 Basis of Payment. *The accepted quantities of this work will be paid for at the contract unit price per megagram (ton) for asphalt for dust palative, complete in place.*

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Asphalt for Dust Palative.....	Mg (TON)

SECTION 408, DELETE LINES 1 THROUGH 203

SECTION 408, AFTER LINE 204, INSERT AS FOLLOWS:

SECTION 408 - SEALING CRACKS AND JOINTS

408.01 Description. *This work shall consist of sealing longitudinal and transverse cracks and joints in existing asphalt pavement in accordance with 105.03.*

MATERIALS

408.02 Materials. *Materials shall be in accordance with the following:*

Asphalt Emulsion for	
Crack Sealing, AE-90, AE-90S, AE-150	902.01(b)
Fine Aggregates, No. 23 or 24	904
Sealant for Routed Cracks and Joints	ASTM D 3405

CONSTRUCTION

408.03 Equipment. *A distributor in accordance with 409.03 shall be used when crack sealing and an indirect-heat double boiler kettle with mechanical agitator shall be used when routing and sealing. Air compressors shall be capable of producing a minimum air pressure of 690 kPa (100 psi).*

408.04 Weather Limitations. Sealing operations shall not be conducted on a wet surface, when the ambient temperature is below 4°C (40°F), or when other unsuitable conditions exist, unless approved by the Engineer.

408.05 Routing. Cracks and joints shall be routed with a vertical-spindle router with carbide-tipped or diamond router bits to form a reservoir not exceeding 13 mm x 13 mm (0.5 in. x 0.5 in.), when required. The operation shall be coordinated such that routed materials do not encroach on pavement lanes carrying traffic and all routed materials are disposed of in accordance with 104.07.

408.06 Sealing Cracks and Joints. Cracks and joints shall be cleaned by blowing with compressed air or by other suitable means. Asphalt material shall be placed utilizing a "V" shaped wand tip, to allow the penetration of the materials into the cracks and joints. The cracks and joints shall be completely filled or overbanded not to exceed 125 mm (5 in.), or as required. All excess asphalt material shall be removed from the pavement. The sealed cracks and joints shall be covered with sufficient fine aggregate to prevent tracking of the asphalt materials. All excess cover material shall be removed from the pavement.

Application of asphalt materials shall be completed without covering existing pavement markings. When traffic is to be maintained within the limits of the section, temporary traffic control measures in accordance with 801 shall be used. Treated areas shall not be opened to traffic until the asphalt material has been absorbed.

408.07 Method of Measurement. Sealing cracks and joints in asphalt pavements will be measured by the megagram (ton) of asphalt material used. Routing of cracks and joints will not be measured.

Temporary traffic control measures will be measured in accordance with 801.17.

408.08 Basis of Payment. Sealing cracks and joints in asphalt pavements will be paid for by the megagram (ton) of asphalt material used for the type specified.

Temporary traffic control measures will be paid for in accordance with 801.18.

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
Cracks and Joints in Asphalt Pavement, Seal.....	Mg (TON)
Cracks and Joints in Asphalt Pavement, Rout and Seal	Mg (TON)

The cost of all materials, cover aggregate, cleaning, and all necessary incidentals shall be included in the cost of the pay items in this section.

SECTION 409, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 409 – ~~Blank~~ EQUIPMENT

409.01 Production, Transportation, and Laydown of Asphalt Mixtures. *For production of asphalt mixtures, the Contractor shall provide all equipment necessary for the production, transportation, and laydown operations.*

409.02 Mixing Plant. *The mixing plant shall be capable of producing a uniform mixture.*

(a) Certified HMA Plant.

A Certified HMA Plant shall be in accordance with ITM 583.

(b) CMA Mixing Plant.

The mixing plant shall be of sufficient capacity and coordination to adequately handle the proposed CMA construction. The mixing unit shall be a twin shaft pugmill or other approved mixer, including the drum type capable of producing a consistent uniform mixture. The outlet of the mixer shall be such that it prevents segregation of the material when discharged.

A certified HMA plant in accordance with 409.02(a) may be utilized as a CMA mixing plant.

409.03 HMA Laydown Operations.

(a) Distributor. *The distributor shall be equipped, maintained, and operated to provide uniform heating and application rates as specified. The distributor shall have a volume measuring device and a thermometer to monitor the asphalt material.*

Distributors shall also be equipped with a power unit for the pump and with a full circulation spray bar with vertical controls.

(b) Hauling Equipment. *The mixtures shall be transported to the laydown operation in trucks that have tight, clean, and smooth beds.*

Truck beds may be treated with approved anti-adhesive agents. The truck beds shall be raised after application of non-foaming anti-adhesive agents to drain the liquids from the bed prior to HMA being loaded into the truck. The Department will maintain a list of approved Anti-Adhesive Materials.

Hauling equipment shall be equipped with a watertight cover to protect the mixture.

(c) Laydown Equipment.

1. Paver. *The paver shall be self-propelled, and equipped with a material receiving system, and equipped with heated and vibrating screeds. The paver may also include automatic slope and grade controls, extendable screeds and extendable augers.*

Automatic control devices shall be separated from the paver screeds, paver tracks or wheels and be capable of adjusting both sides of the screeds automatically to maintain a constant angle of attack in relation to the grade leveler device or grade line.

A grade leveling system may be used to activate the control devices on each HMA course, including matching lays. The leveling system shall be attached to the paver and operated parallel to the paver's line of travel.

Extendable screeds shall be rigid, heated, and vibrating, and be capable of maintaining the cross slope, and line and grade of the pavement, to produce uniform placement of the materials.

Auger extensions shall be used when required to distribute the HMA uniformly in front of the screed.

2. Widener. *A device capable of receiving, transferring, spreading, and striking off materials to the proper grade and slope.*

3. Other Mechanical Devices. *Inaccessible or short sections of HMA may be placed with specialty equipment approved by the Engineer.*

(d) Compaction Equipment. *Compaction equipment shall be self-propelled, steel wheel or pneumatic tire types, in good condition, and capable of reversing direction without backlashing. All roller wheels shall be equipped with scrapers to keep the wheels clean, have water spraying devices on the wheels, and steering devices capable of accurately guiding the roller.*

1. Tandem Roller. *A roller having two axles and a minimum mass (weight) of 9 Mg (10 t).*

2. Three Wheel Roller. *A roller having three wheels with a minimum bearing of 5.3 kg/mm (300 lb/in.) on the rear wheels. The crown of the wheels shall not exceed 63 mm (2.5 in.) in 5.5 m (18 ft).*

A tandem roller which has a drive wheel bearing of no less than 5.3 kg/mm (300 lb/in.) may be used in lieu of the three wheel roller.

3. Pneumatic Tire Roller. *A pneumatic tire roller shall have a minimum rolling width of 1.65 m (5.5 ft). The roller shall be equipped with compaction tires, minimum size 7:50 by 15, exerting a uniform, average contact pressure from 345 to 620 kPa (50 to 90 psi) uniformly over the pavement by adjusting ballast and tire inflation pressures. The wheels on at least one axle shall be fully oscillating vertically, and mounted as to prevent scuffing of the pavements during rolling or turning operations. Charts or tabulations showing the contact areas and pressures for the full range of tire inflation pressures and for the full range of tire loadings for each compactor shall be furnished to the Engineer.*

4. Vibratory Roller. *A vibratory roller shall be equipped with a variable amplitude system, a speed control device, and have a minimum vibration frequency of 2000 vibrations per min. A reed tachometer shall be provided for verifying the frequency of vibrations.*

5. Trench Roller. *A trench roller shall have a compaction wheel bearing of no less than 5.3 kg/mm (300 lb/in.).*

6. Specialty Roller/Compactor. *Inaccessible or short sections of HMA may be compacted with specialty equipment approved by the Engineer.*

(e) Miscellaneous Equipment.

1. Aggregate Spreader. *A spreader shall be self-propelled, pneumatic tired-motorized unit with a front loading hopper and a transportation system for distributing the aggregates uniformly across the pavement.*

2. Rotary Power Broom. *A motorized, pneumatic tired unit with rotary bristle broom head.*

(f) Smoothness Equipment.

1. Profilograph. *The profilograph shall be in accordance with ITM 901.*

2. Straightedge - 4.9 m (16 ft). *A 4.9 m (16 ft) straightedge shall be a rigid beam mounted on two solid wheels on axles 4.875 m (16 ft) apart. The straightedge has a mounted push bar to facilitate propelling the device along or across the pavement. Tolerance points are located at the 1/4, 1/2, and 3/4 points and may be composed of threaded bolts capable of being adjusted to the tolerance required.*

3. Straightedge - 3 m (10 ft). *A 3 m (10 ft) straightedge is the same as a 4.9 m straightedge except that the wheels are mounted 3.048 m (10 ft) apart. A handheld rigid beam may be substituted.*

GUARDRAIL BLOCKOUTS

In lieu of the wood blockouts currently allowed by the specifications, blockouts may be selected from the following list. The blockouts shall be dimensioned as tested and shall be used with the type of guardrail as tested in accordance with NCHRP 350. If selected from the list, the blockouts shall be accompanied by a certification from the manufacturer stating the blockouts furnished have the same chemistry, mechanical properties, and geometry as those certified to have passed the NCHRP 350 crash test and have been certified by the Federal Highway Administration to be acceptable for use on NHS facilities.

Blockouts from the following list may be used interchangeably with wood blockouts as long as the line and grade of the face of the guardrail is true to that shown on the plans and the conditions of the first paragraph above are met.

Manufacturers wishing to have blockouts placed on the following list shall furnish the Department copies of the NCHRP 350 test results and a letter from the Federal Highway Administration approving them for use on NHS facilities. Such information shall be forwarded to the Standards Manager, Indiana Department of Transportation, Room N642, 100 N. Senate Avenue, Indianapolis, IN 46204.

Dura-Bull
Creative Building Product
Div. of Spirit of America Corp.
4307 Arden Drive
Fort Wayne, IN 46804
1 (800) 860-2855

Eco-Block
Eco-Composites LLC
17169 Hayes Road
Grand Haven, MI 49417
(616) 844-2001

King Block
Trinity Industries, Inc.
655 East Dixie Drive
Elizabethtown, KY 42701
(800) 282-7668

MONDOBlock
MONDO Polymer Technologies
State Route 7
P.O. Box 250
Reno, OH 45773
(740) 376-9396

Polylumber PL6814R
RAMCO International
P.O. Box 9625
Pittsburg, PA 15226
(412) 494-0743

Polylumber PL5814R
 RAMCO International
 P.O. Box 56
 Imperial, PA 15126

PBLOCK
 R. G. Steel Corporation
 P.O. Box 356
 Rt. 551
 Pulaski, PA 16143
 (724) 656-1722

APPROACHES AND CROSSOVERS

The Standard Specifications are revised as follows:

SECTION 610, DELETE LINES 1 THROUGH 140

SECTION 610, AFTER LINE 141, INSERT AS FOLLOWS:

SECTION 610 -- APPROACHES AND CROSSOVERS

610.01 Description. *This work shall consist of constructing or resurfacing from the edge of the main line pavement to the right-of-way line at public road intersections; turn lanes, passing lanes, acceleration lanes, deceleration lanes, or recovery lanes where the total longitudinal dimension is less than 30 m (100 ft), excluding tapers; mail box approaches; from the edge of the mainline surface to a width of 1 m (36 in.) on private and commercial driveways; and crossovers; all in accordance with 105.03.*

MATERIALS

610.02 Materials. *Materials shall be in accordance with the following:*

Aggregate Base.....	301.02
Subbase.....	302.02
HMA.....	402.02
PCCP.....	502.02

CONSTRUCTION REQUIREMENTS

610.03 General Requirements. *Subgrade for approaches shall be prepared in accordance with 207. Aggregate base shall be constructed in accordance with 301. HMA for approaches shall be constructed in accordance with 402. HMA mixture for approaches shall be HMA surface or intermediate, type A, B, or C in accordance with 402.04. A MAF in accordance with 402.04 will not apply.*

Dense graded subbase shall be constructed in accordance with 302. PCCP for approaches shall be constructed in accordance with 502.

610.04 Existing Approaches and Crossovers. *If an existing surface is to be left in place as an approach pavement or crossover the surface shall be patched in accordance with 304.04 or 305.04, or as directed.*

610.05 Method of Measurement. *Compacted aggregate base will be measured by the megagram (ton) in accordance with 109.01(b). HMA mixture for approaches will be measured by the megagram (ton) of the type specified, in accordance with 109.01(b). Dense graded subbase will be measured in accordance with 302.08. PCCP for approaches will be measured in accordance with 502.22.*

HMA patching in accordance with 610.04, will be measured by the megagram (ton) in accordance with 304.06. PCCP patching in accordance with 610.04, will be measured by the square meter (square yard) in accordance with 305.06.

Prime coat will be measured in accordance with 405.09. Tack coat will be measured in accordance with 406.06. Seal coat will be measured in accordance with 404.09.

610.06 Basis of Payment. *The accepted quantities of HMA mixture for approaches will be paid for at the contract unit price per megagram (ton) of the type specified, complete in place. Compacted aggregate base will be paid for in accordance with 301.10. PCCP for approaches will be paid for at the contract unit price per square meter (square yard), complete in place.*

HMA patching will be paid for in accordance with 304.07. PCCP patching will be paid for in accordance with 305.07.

Prime coat will be paid for in accordance with 405.10. Tack coat will be paid for in accordance with 406.07. Seal coat will be paid for in accordance with 404.10.

The accepted quantities of HMA material for mailbox approaches will be included with quantities required to construct the shoulder section when the shoulder is to be paved. If the shoulder is not to be paved, the HMA material for mailbox approaches will be paid for as HMA mixture for approaches.

Payment will be made under:

Pay Item	Metric Pay Unit Symbol (English Pay Unit Symbol)
HMA for Approaches, Type ____*	Mg (TON)
PCCP for Approaches	m2 (SYS)

** Mixture type in accordance with 402.04*

The cost of excavation, shaping, leveling, forming, compaction, placing and all necessary incidentals shall be included in the cost of the pay items in this section.

The cost of the 1 m (3 ft) wedge placed on approaches at the same time and in conjunction with the mainline HMA intermediate or surface, or if turn lanes, passing lanes, acceleration lanes, deceleration lanes, or recovery lanes are greater than 30 m (100 ft) longitudinally, payment will be made at the same unit price as for the material placed on the mainline.

The cost for curbing placed monolithically with the PCCP for approaches shall be included in the cost of PCCP for approaches.

CERTIFICATION OF TEMPORARY TRAFFIC CONTROL DEVICES

Category 1 Devices

The Contractor shall certify that the following temporary traffic control devices to be used do not exceed the maximum values shown in the table below, and are considered crashworthy at Test Level 3 in accordance with National Cooperative Highway Research Program Report No. 350.

Device	Composition	Maximum Mass (Weight)	Maximum Height
Single Piece Traffic cones	Rubber	9 kg (20 lb)	920 mm (36 in.)
	Plastic	9 kg (20 lb)	1220 mm (48 in.)
Tubular Markers	Rubber	6 kg (13 lb)	920 mm (36 in.)
	Plastic	6 kg (13 lb)	920 mm (36 in.)
Single Piece Drums	High Density Plastic	35 kg (77 lb)	920 mm (36 in.)
	Low Density Plastic	35 kg (77 lb)	920 mm (36 in.)
Delineators	Plastic, Fiberglass	N/A	1220 mm (48 in.)

No lights, signs, flags, or other auxiliary attachments are included in the mass (weight) of the devices listed above. Reflective sheeting or reflective buttons are included on delineators. Maximum masses (weights), including ballast, do not exceed the values shown in the table. "Single piece" refers to the construction of the body of the drum exclusive of a separate base, if any.

Type A or type C warning lights in accordance with the following specifications will be allowed on drums if they are firmly attached with vandal resistant 13 mm (1/2 in.) diameter by 95 mm (4 in.) cadmium plated steel bolt with nut and a 38 mm (1 1/2 in. high cup washer.

1. The mass (weight) shall be no more than 2.4 kg (5 lb).
2. The lens diameter shall be 180 to 200 mm (7 to 8 in.)
3. The height of the light shall be 270 to 340 mm (11 to 14 in.)

Category II Devices

Category II temporary traffic control devices include type III barricades, vertical panels, portable sign standards, and other light-weight traffic control devices.

Category II temporary traffic control devices shall be in accordance with the NCHRP Report 350, test level 3.

A form will be provided at the pre-construction conference for the Contractor to complete and return to the Engineer prior to the placement of category I or II traffic control devices.

MAINTAINING TRAFFIC FOR MAINTENANCE OR RESURFACE WORK

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 113, INSERT AS FOLLOWS:

Traffic shall be maintained for maintenance activities or for HMA resurface work as shown on the plans or as described herein. The Contractor shall have an extra set of construction signs and an extra flashing arrow sign on the project site so that the taper may be moved forward without suspending the operations and clearing the work area. Additional traffic control devices shall be furnished for situations determined to be more complex, for protection in hazardous areas, and when traffic conditions warrant.

All nonfixed signs shall be removed at the completion of each day's operations. All lanes shall be open to normal traffic during hours other than daylight hours. If a traffic lane is directed to remain closed during hours other than daylight hours, traffic shall be maintained on the remaining lanes as shown on the plans.

All fixed signs shall remain in place until all temporary pavement markings have been removed. Work days will not be charged from the time of completion of other work until the markings have been removed.

TEMPORARY MOUNTED CONSTRUCTION SIGN

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 152, INSERT AS FOLLOWS:

Temporary mounted construction signs shall not be used for operations which affect traffic lanes or paved shoulders. Temporary mounted construction signs shall not be used or left in place during nighttime hours.

SECTION 801, AFTER LINE 911, INSERT AS FOLLOWS:

Temporary mounted construction signs will not be paid for.

REMOVAL OF SNOWPLOWABLE RAISED PAVEMENT MARKERS

The Standard Specifications are revised as follows:

SECTION 808, BEGIN LINE 404, DELETE AND INSERT AS FOLLOWS:

Removed markers shall ~~remain~~ become the property of the ~~Department unless otherwise specified~~ Contractor and removed from the jobsite prior to the completion of the work.

SECTION 808, BEGIN LINE 407, DELETE AS FOLLOWS:

~~Removed snowplowable raised pavement markers shall be delivered to the District Traffic Division. The markers shall be delivered in 210 L (55 gal.) metal containers with lids which may be sealed. The metal containers shall be furnished either by the Contractor or by the District Traffic Division as specified in the contract. Approximately 50 markers shall be placed in each container. Each container shall be labeled as to how many markers it contains.~~

~~All metal containers used for delivering removed markers will remain the property of the Department when no longer required for the contract.~~

SECTION 808, BEGIN LINE 512, DELETE AS FOLLOWS:

~~The cost of metal containers for disposal of removed snowplowable raised pavement markers, if furnished by the Contractor, shall be included in the costs of other pay items. The cost of picking up and returning such metal containers, if furnished by the District Traffic Division, shall be included in the costs of other pay items.~~

~~The cost of delivering removed and packaged snowplowable raised pavement markers to the designated location shall be included in the cost of transportation of salvageable materials.~~

ASPHALT MATERIALS

The Standard Specifications are revised as follows:

SECTION 902, DELETE LINES 1 THROUGH 284.

SECTION 902, AFTER LINE 285, INSERT AS FOLLOWS:

SECTION 902 – ASPHALT MATERIALS

902.01 Asphalt. *Asphalt is defined as a cementitious material obtained from petroleum processes. Asphalts shall be sampled and tested in accordance with the applicable requirements of 902.02.*

(a) Performance Graded Asphalt Binders. *Performance graded asphalt binders shall be supplied by an approved supplier in accordance with ITM 581.*

Performance graded, PG asphalt binders shall be in accordance with the following:

GRADE	PG 58-28	PG 64-22	PG 64-28	PG 70-22	PG 70-28	PG 76-22
ORIGINAL BINDER						
Flash Point, minimum °C		230				
Viscosity, maximum, 3 Pa·s, Test Temp., °C		135				
DSR, G*/sin δ (delta), minimum, 1.00 kPa, Test Temp. @ 10 rad/s, °C	58	64	64	70	70	76
ROLLING THIN FILM OVER RESIDUE						
Mass Loss, maximum, %		1.00				
DSR, G*/sin δ (delta), minimum, 2.20 kPa, Test Temp. @ 10 rad/s, °C	58	64	64	70	70	76
PRESSURE AGING VESSEL (PAV) RESIDUE						
PAV Aging Temperature °C (Note 1)	100	100	100	100	100	100
DSR, G*/sin δ (delta), maximum, 5000 kPa, Test Temp. @ 10 rad/s, °C	19	25	22	28	25	31
Physical Hardening (Note 2)		Report				
Creep Stiffness, S, maximum, 300 MPa, m-value, minimum, 0.300 Test Temp. @ 60 s, °C	-18	-12	-18	-12	-18	-12

NOTES 1. Oven temperature tolerance shall be $\pm 0.5^\circ\text{C}$.

2. Physical Hardening is performed on a set of asphalt beams according to AASHTO T 313, Section 12.1, except the conditioning time is extended to 24 h \pm 10 min at 10°C above the minimum performance temperature. The 24 h stiffness and m-value are reported for information purposes only.

1. Appeals. If the Contractor does not agree with the acceptance test results for the lot, a request may be made in writing for additional testing. The appeal shall be submitted within 30 calendar days of receipt of the Department's written results. The basis of the appeal shall include complete AASHTO M 320 test results for the specific subplot in question plus test values from all other sublots for the parameters being disputed.

If an appeal is accepted, the Department will randomly select two additional subplot samples if available from the lot in question. The additional subplot samples if available and the backup sample will be tested in an AASHTO accredited laboratory for the failing test parameters. The backup and additional test results for each test will be averaged. The average value for each test will be considered the final lot value. The Contractor will be notified in writing of the additional test results, the final lot values, and the appeal conclusions.

If the appeal is not accepted, the Department will respond to the Contractor stating the grounds for the denial.

(b) Asphalt Emulsions. Asphalt emulsions shall be composed of an intimate homogeneous suspension of a base asphalt, an emulsifying agent, and water. Asphalt emulsions may contain additives to improve handling and performance characteristics. Failure of an emulsion to perform satisfactorily in the field shall be cause for rejection, even though it passes laboratory tests. The grade used shall be in accordance with the table for asphalt emulsions as shown herein.

AE-90 is a medium-breaking, moderate penetration, high-asphalt content type, intended for hot and cold plant mixing, road mixing, and seal coats or as otherwise specified.

AE-90S is a rapid setting, anionic type emulsion for seal coat applications.

AE-150 is a medium-breaking, moderately soft penetration type, intended for use in surface treating, tack coats, and coating open and dense graded aggregate, or as otherwise specified.

AE-150-L is a medium-breaking, relatively low-viscosity type. It may be specified in lieu of AE-T or AE-150 when a softer asphalt or greater aggregate penetration is desired. AE-150-L is suitable for sand seals.

AE-PL is a medium-slow-breaking, low-viscosity, low-asphalt content type, intended for use as a prime or as dust palative.

AE-T is a medium-breaking, comparatively low penetration type, intended for tack coats, seed mulching, or as otherwise specified.

HFRS-2 is a quick-breaking, high-viscosity, high-float, relatively high asphalt content type, intended for seal coats.

RS-2 is a quick-breaking, high-viscosity, relatively high-asphalt content type, intended for seal coats.

AE-PMP is a polymerized modified asphalt emulsion intended for use as a prime coat material.

AE-PMT is a polymerized modified asphalt emulsion intended for use as a tack coat material.

The requirements for asphalt emulsions shall be in accordance with the following:

Characteristic (1) (2)	Test Method	RS-2	HFRS-2	AE-90	AE-90S	AE-T	AE-150	AE-150L	AE-PL	AE-PMT (6)	AE-PMP (6)
<i>Test on Emulsion</i>											
Viscosity, Saybolt Furol at 25°C, min.	AASHTO T 72			50			50				20+
Viscosity, Saybolt Furol at 25°C, max.	AASHTO T 72					100		100	115	100	
Viscosity, Saybolt Furol at 50°C, min.	AASHTO T 72	75	75		50		75				
Viscosity, Saybolt Furol at 50°C, max.	AASHTO T 72	400	400				300				
Demulsibility w/35 mL, 0.02N CaCl ₂ , % min.	AASHTO T 59	50	50		30						
Demulsibility w/50 mL, 0.10N CaCl ₂ , % min.	AASHTO T 59			75		75				25+	25+
Oil Distillate by Distillation, mL/100 g Emul. (3)	AASHTO T 59	4.0	4.0	4.0	3.0	4.0	7.0	7.0	3.0	3.0	3.0
Residue by Distillation, % min.	AASHTO T 59	68	68	68	65 (5)	54	68	60	30		
Residue by Distillation, % max.	AASHTO T 59					62		65			
Sieve Test, % max.	AASHTO T 59	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Penetrating Ability, mm, min.	902.02(w)								6		
Stone Coating Test, %	902.02(t)3a			90			90	90			
Settlement, % max.	AASHTO T 59	5	5	5							
Storage Stability, % max.	AASHTO T 59				1						
Asphalt Content by Distillation at 204°C, % min.										54	45
Asphalt Content by Distillation at 204°C, % max.										62	
<i>Tests on Residue</i>											
Penetration (0.1 mm) at 25°C, 100g, 5 s, min. (4)	AASHTO T 49	100	100	100	90	50				50	300+
Penetration (0.1 mm) at 25°C, 100g, 5 s, max. (4)	AASHTO T 49	200	200	200	150	200				200	
Penetration (0.1 mm) at 25°C, 50g, 5 s, min. (4)	AASHTO T 49						100	100			
Penetration (0.1 mm) at 25°C, 50g, 5 s, max. (4)	AASHTO T 49						300	300			
Ductility at 25°C, mm, min.	AASHTO T 51	400	400	400		400					
Solubility in Org. Sol., % min.	AASHTO T 44	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
Float Test at 50°C, s, max. (4)	AASHTO T 50										
Float Test at 60°C, s, min. (4)	AASHTO T 50		1200	1200	1200	1200	1200	1200			
Force Ratio	AASHTO T 300				0.3						
Elastic Recovery, at 4°C	AASHTO T 301				58					1.5+	1.5+
<i>Polymer Content by Infrared</i>											

NOTES: (1) Broken samples or samples more than 10 days old will not be tested.

(2) Combined percentage of the residue and oil distillate by distillation shall be at least 70% (note the different units – mL for oil and % for residue).

(3) Oil distillate shall be in accordance with ASTM D 396, table 1, grade no. 1.

(4) The Engineer may waive the test.

(5) Maximum temperature to be held for 15 minutes 200 ± 5°C.

(6) Asphalt shall be polymerized prior to emulsification.

(c) Cutback Asphalts. Cutback asphalts shall be composed of an intimate homogeneous mixture of an asphalt base and a suitable distillate designed for medium, or slow curing. Cutback asphalts may also contain an additive as an aid in uniformly coating wet, damp, or dry aggregates used in patching mixtures or HMA pavements. These asphalts shall not contain more than 0.3% water as determined by AASHTO T 55, shall not separate when allowed to stand, and shall not foam when heated to permissible temperatures. When an additive is used, it shall be incorporated homogeneously in the asphalt at the point of manufacture. The temperature of the cutback asphalt shall not be higher than shown for that grade in 902.03.

1. Medium Curing Asphalts With and Without Additives. Medium curing asphalts with and without additives shall be in accordance with the following:

Characteristics	Grades			
	MC-70 MCA-70	MC-250 MCA-250	MC-800 MCA-800	MC-3000 MCA-3000
Flash Point (Open Tag.), °C ⁽⁴⁾	38+	66+	66+	66+
Kinematic Viscosity at 60°C (cSt.) ⁽²⁾	70-140	250-500	800-1600	3000-6000
Saybolt-Furol Viscosity at 50°C (s)	60-120	125-250	100-200	300-600
Saybolt-Furol Viscosity at 60°C (s)				
Saybolt-Furol Viscosity at 83°C (s)				
Distillation ⁽¹⁾				
Distillate (% of total distillate to 360°C MC-70 @ 225°C):				
to 225°C	0-20	0-10		
to 260°C	20-60	15-55	35+	15+
to 316°C	65-90	60-87	45-80	15-75
Residue from distillation to 360°C (volume % by difference)	55+	67+	75+	80+
Tests on Residue from Distillation: ⁽¹⁾				
Penetration, 25°C, 100 g, 5 s - (0.1 mm)				
(without additive)	120-250	120-250	120-250	120-250
(with additive)	120-300	120-300	120-300	120-300
Ductility, 25°C (10 mm) ⁽³⁾	100+	100+	100+	100+
Solubility in organic solvents, %	99.5+	99.5+	99.5+	99.5+

(1) Test may be waived when approved.

(2) Viscosity may be determined by either the Saybolt-Furol or Kinematic test. In case of dispute, the Kinematic viscosity test shall prevail.

(3) If the ductility at 25°C is less than 100, the material will be acceptable if its ductility at 16°C is 100+.

(4) Flash point by Cleveland Open Cup may be used for products having a flash point greater than 80°C.

2. Slow Curing Asphalts With and Without Additives. Slow curing asphalts with and without additives shall be in accordance with the following:

Characteristics	Grades			
	SC-70 SCA-70	SC-250 SCA-250	SC-800 SCA-800	SC-3000 SCA-3000
Flash Point (Cleveland Open Cup), (°C)	66+	79+	93+	107+
Kinematic Viscosity at 60°C (cSt) ⁽²⁾	70-140	250-500	800-1600	3000-6000
Saybolt-Furol Viscosity at 50°C (s)	60-120	125-250		
Saybolt-Furol Viscosity at 60°C (s)				
Saybolt-Furol Viscosity at 83°C (s)			100-200	300-600
Distillation ⁽¹⁾				
Total Distillate to 360°C (% by volume)	10-30	4-20	2-12	5
Float Test of Distillation Residue at 50°C (s)	20-100	25-110	50-140	75-200
Ductility of Asphalt Residue at 25°C (10 mm) ⁽¹⁾	100+	100+	100+	100+
Solubility in organic solvents, % ⁽¹⁾	99.5+	99.5+	99.5+	99.5+

(1) Test may be waived when approved.

(2) Viscosity may be determined by either the Saybolt-Furol or Kinematic test. In case of dispute, the Kinematic viscosity test shall prevail.

(d) Utility Asphalt. The asphalts shall be uniform in character and shall not foam when heated to 177°C (350°F). Utility asphalts shall be in accordance with the following:

Characteristics/Grades	UA-I	UA-II	UA-III
Softening Point (Ring & Ball), °C	46-63	63-85	79.5-96
Penetration of Original Samples ⁽¹⁾ (0.1 mm)			
at 4°C, 200 g, 60, s Min.	10	10	10
at 25°C, 100 g, 5 s	50-100	25-45	15-35
at 46°C, 50 g, 5 s	100 Min.	130 Max.	90 Max.
Ductility @ 25°C, 50 mm/min, 10 mm, Min. ⁽¹⁾	30	10	2.5
Solubility in Organic Solvents, percent, Min. ⁽¹⁾	99.0	99.0	99.0
Flash Point (Cleveland Open Cup), °C, Min. ⁽¹⁾	225	225	225
Penetration of Residue from Thin Film Oven Test, 25°C, 100 g, 5 s, (0.1 mm) Min. ⁽¹⁾	30	15	10

(1) Test will be performed when complete physical characteristics are needed or desired.

(e) Asphalt for Coating Corrugated Metal Pipe. Asphalt for coating corrugated metal pipe shall be in accordance with the following:

<i>Physical Properties</i>	<i>Minimum</i>	<i>Maximum</i>
<i>Softening Point (Ring & Ball), °C</i>	<i>93</i>	<i>110</i>
<i>Penetration of Original Samples (0.1 mm) at 4°C, 200 g, 60 s, Min. at 25°C, 100 g, 5 s</i>	<i>20 35⁽¹⁾</i>	
<i>Solubility In Organic Solvents, %</i>	<i>99.0</i>	
<i>Flash Point (Cleveland Open Cup), °C</i>	<i>232</i>	
<i>Flow Test, mm</i>		<i>6.4</i>
<i>Shock Test</i>	<i>3 of 4 specimens shall pass</i>	

(1) May be 30 minimum provided all four shock test specimens pass.

902.02 Sampling and Testing Asphalt Materials. The tests and AASHTO reference are as follows:

(a) Sampling Bituminous Materials..... AASHTO T 40

The following exceptions to AASHTO T 40 shall apply:

1. Samples may be obtained at any time before material is incorporated into the work.
2. Samples for all grades of asphalt emulsion shall be a minimum of 1.9 L (1/2 gal.). The size of samples of other liquid material may be 1.0 L (1 qt).
3. Samples of liquid materials shall be obtained as follows at one of the following:
 - a. bulk storage tanks from ~~approved~~ sampling valves located in the tank or line and asphalt plant storage tanks from ~~approved~~ sampling valves located in the tank
 - b. transports from approved sampling valves
 - c. distributors from approved sampling valves
 - d. other storage or locations as approved
 - e. sampling by other recognized devices may be approved

(b) Water in petroleum products, except the solvent
or carrier may be toluene AASHTO T 55

- (c) *Density, Specific Gravity, or API Gravity of Crude Petroleum and Liquid Products by Hydrometer Method*..... AASHTO T 227
- (d) *Specific Gravity of Semi-Solid Bituminous Materials* AASHTO T 228
- (e) *Specific Gravity of Solid Pitch and Asphalt*..... AASHTO T 229
- (f) *Flash and Fire Points (Open Cup)*
 - 1. *When the flash point is higher than 79°C (175°F), "Flash and Fire Points by Cleveland Open Cup"* AASHTO T 48
 - 2. *When the flash point is 79°C (175°F) or lower, "Flash Point with Tagliabue Open Cup"*..... AASHTO T 79
- (g) *Softening Point of Bituminous Materials, Ring and Ball* AASHTO T 53
- (h) *Penetration of Bituminous Materials*..... AASHTO T 49
- (i) *Loss on Heating* AASHTO T 47
- (j) *Solubility in Organic Solvents, except the solvent may be 1,1,1,-Trichloroethane* AASHTO T 44
- (k) *Inorganic Matter or Ash* AASHTO T 59
- (l) *Saybolt-Furol Viscosity*..... AASHTO T 72
- (m) *Ductility of Binder Material, except that the conditioning period of the specimens may be shortened, and that only one normal test will be required. Shortened conditioning period: The specimen shall be allowed to cool in air for at least 30 min. It shall then be trimmed and placed in the water bath for a period of 60 to 90 min before testing. In case of failure or dispute, three normal tests will be required and specimens shall be conditioned as in AASHTO T 51*
- (n) *Distillation of Cutback Asphaltic Products, except the length of condenser tube may be 400 mm ± 24 mm*..... AASHTO T 78
- (o) *Float Test for Bituminous Materials*..... AASHTO T 50

- (p) *Kinematic Viscosity of Asphalts*..... AASHTO T 201
- (q) *Absolute Viscosity of Asphalts* AASHTO T 202
- (r) *Effect of Heat and Air on Asphalt Materials, Thin-Film Oven Test* AASHTO T 179
- (s) *Effect of Heat and Air on a Moving Film of Asphalt, Rolling Thin Film Oven Test*..... AASHTO T 240
- (t) *Testing Asphalt Emulsions*..... AASHTO T 59
The following exceptions to T 59 shall apply:
1. *For the Residue by Distillation test, the specified aluminum alloy still shall be the referee still.*
 2. *When tests on the residue are not required, the percent of residue for emulsion grades RS-2, AE-90, AE-90S, and AE-T only, may be determined by the Residue by Evaporation test of AASHTO T 59. The percent of residue shall be determined by the Residue of Distillation test in all cases of failure or dispute.*
 3. *The stone coating test shall be performed as follows on a mixture of 465 ± 1 g of reference stone and 35.0 ± 0.1 g of asphalt emulsion:*
 - a. *For AE-90 and AE-90S, the mixture of stone and asphalt shall be mixed vigorously for 5 min. At the end of the mixing period, the mix shall be rinsed by running sufficient tap water at the side of the container to completely immerse the mix. The tap water shall then be poured off and the rinsing step repeated as necessary until the rinse water pours off essentially clear. The stone shall remain a minimum of 90% coated.*
 - b. *For AE-150 and AE-150-L, the mixture of stone and asphalt shall be mixed vigorously for 5 min and then allowed to stand for 3 h. At the end of this time, the mixture shall again be mixed vigorously for 5 min. At the end of the mixing period, the mix shall be rinsed by running sufficient tap water at the side of the container to completely immerse the mix. The tap water shall then be poured off and the rinsing step repeated as necessary until the rinse water pours off essentially clear. The stone shall remain a minimum of 90% coated for AE-150 and AE 150-L.*
 4. *For the Demulsibility test, normally only one test will be required. In case of failure or dispute, the specified procedure in AASHTO T 59 will be followed.*

5. For oil portion from Residue by Distillation, report the number of milliliters of oil per 100 g of emulsion.
- (u) For coating test for cutback asphalts with additive, 20 g of 20 to 30 mesh Ottawa sand shall be placed in a clean 60 mL (2 oz) wide-mouthed jar and covered with 25 g of distilled water at room temperature. One gram of the liquid asphalt to be tested shall be placed gently upon the surface of the water so that it floats and does not contact the sand. The lid shall then be placed on the jar and tightened securely. If the liquid asphalt to be tested is grade 70 or 250, the jar and contents shall be shaken vigorously for 30 s. If the grade is 800 or 3000, the jar and contents shall be immersed in a 46°C (115°F) water bath for 5 min to bring the contents of the jar to a temperature of approximately 38°C (100°F). The jar shall then be shaken vigorously for 30 s. After shaking, the asphalt coating on the sand shall be observed under a constant, strong light. Complete coating of the sand is required.
- (v) Stripping tests for HMA mixtures using binder materials, with or without additives, shall be performed as follows:
1. **Test 1.** A sample of produced mixture, 500 g, minimum, shall be obtained for testing. The size of test specimen and the amount of distilled water shall be:

<i>Approximate Size of Aggregate</i>	<i>Minimum Weight of Test Specimen</i>	<i>Amount of Distilled Water</i>
<i>Sand</i>	<i>100 g</i>	<i>400 mL</i>
<i>12</i>	<i>100 g</i>	<i>400 mL</i>
<i>11</i>	<i>150 g</i>	<i>600 mL</i>
<i>9</i>	<i>200 g</i>	<i>600 mL</i>

Place the specimen in the boiling distilled water and stir with a glass rod at the rate of one revolution per second for 3 min. The aggregate shall retain a minimum of 90% of its asphalt film compared with the remainder of the sample, upon completion of this procedure.

2. *Test 2. Approximately 500 g of produced mixture shall be heated to 121°C (250°F) in a laboratory oven for 2 h; stirred and cooled to 92.5°C (200°F). Then a portion of the mix shall be placed in boiling distilled water, quantity of mix and quantity of boiling water shall be as specified in Test 1, and stirred with a glass rod at the rate of one revolution per second for 3 min. The aggregate shall retain a minimum of 90% of its asphalt film compared with the remainder of the sample, upon completion of this procedure.*

Note: The purpose of these tests is to determine the relative compatibility of the aggregate and asphalt, and to detect tendency of Asphalt Emulsions to reemulsify. Test 2 may be performed as a method of determining whether compatibility can be achieved, Test 1 having given unsatisfactory results.

(w) Penetrating Ability of AE-PL.

1. *Apparatus and Equipment:*

- a. *Sand mixture:*

- (1) *Dry Standard Ottawa Sand (AASHTO T 106) 90 parts*

- (2) *Dry Reference Limestone Dust, portion passing 300 mm (#50) sieve only. Reference Limestone Dust used by the Department is Limestone Calcium Carbonate manufactured by France Stone Co. The Department will furnish approximately 2.3 kg (5 lb) of Reference Limestone Dust upon request 10 parts*

- (3) *Water 3 parts*

- b. *Container, 170 g (6 oz) ointment tin*

- c. *Ruler or other measuring device*

- d. *Timing device readable in seconds*

- e. *Compacting Device. Rimac Spring Tester or other device suitable for compacting sand by applying a 140 kPa (20 psi) load. The compacting device shall include an adapter consisting of two metal discs slightly smaller in diameter than a 170 g (6 oz) ointment tin separated by a spacer 25 to 50 mm (1 to 2 in.). The 65 mm (2.5 in.) diameter discs used in determining weight of coating in AASHTO T 65 or ASTM A 90 are satisfactory.*

- f. *Small, square ended spatula or putty knife*

2. Procedure:

Thoroughly mix Standard Ottawa Sand, Reference Limestone Dust, and water. Weigh 190 ± 1 g of sand mixture into a 170 g (6 oz) ointment tin. Level surface of sand with a spatula. Place the compacting adapter on the sand surface and slowly, over a period of about 5 s, compact the sand until the 140 kPa (20 psi) load is achieved, which is approximately 45 kg (100 lb) on the Rimac Spring Tester. Remove the compacting device, avoiding disturbance to the sand surface. Quickly pour 12 g of the emulsion from a height of about 100 mm (4 in.) onto top of sand mixture. Start timer at start of pour. Stop timer when all emulsion penetrates into sand mixture. Delay 2 min, then remove sand and mixture from one side of ointment tin, about 1/2 of mixture. Measure to determine average depth of penetration into sand mixture. Penetration time shall be 100 s or less; penetration depth shall be 6 mm (1/4 in.) or more.

- (x) *Flow Test for Asphalt for Coating Corrugated Metal Pipe..... AASHTO M 190*
- (y) *Shock Test for Asphalt for Coating Corrugated Metal Pipe..... AASHTO M 190*
- (z) *Viscosity Determinations of Unfilled Asphalts Using the Brookfield Thermosel Apparatus..... AASHTO T 316*
- (aa) *Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer..... AASHTO T 315*
- (bb) *Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel..... AASHTO R 28*
- (cc) *Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer AASHTO T 313*

902.03 Application Temperatures. *Binder materials for the several applications indicated in the specifications shall be applied at temperatures not to exceed those shown in the following:*

<i>Type and Grade of Material</i>	<i>Maximum Application Temperature °C (°F)</i>	
	<i>Spray</i>	<i>Mix</i>
<i>MC-70, MCA-70</i>	<i>66 (150)</i>	
<i>MC-250, MCA-250</i>	<i>107 (225)</i>	<i>93 (200)</i>
<i>MC-800, MCA-800</i>	<i>121 (250)</i>	<i>107 (225)</i>
<i>MC-3000, MCA-3000</i>	<i>135 (275)</i>	<i>121 (250)</i>
<i>SC-70, SCA-70.....</i>	<i>93 (200)</i>	
<i>CS-250, SCA-250.....</i>	<i>107 (225)</i>	<i>107 (225)</i>
<i>SC-800-3000, SCA-800-3000</i>	<i>121 (250)</i>	<i>121 (250)</i>
<i>All Emulsions</i>	<i>71 (160)</i>	<i>82 (180)</i>
<i>All Penetration and Viscosity, Utility and Pipe Coating</i>	<i>177 (350)</i>	<i>163 (325)</i>
<i>PG Binders.....</i>	<i>Note (1)</i>	<i>Note (1)</i>

Note (1): In accordance with manufacturer's recommendations.

AGGREGATES

The Standard Specifications are revised as follows:

SECTION 904, AFTER LINE 430, DELETE AND INSERT AS FOLLOWS:

904.01 Aggregates. *Aggregates shall consist of natural or manufactured materials produced from but not limited to limestone, dolomite, gravels, sandstones, steel furnace slag (SF), air-cooled blast furnace slag (ACBF), granulated blast furnace slag (GBF), ~~or~~ wet bottom boiler slag, or other geologic rock types approved by the Engineer.*

MILLING

The Standard Specifications are revised as follows:

SECTION 202, BEGIN LINE 174, DELETE AND INSERT AS FOLLOWS:

202.05 Removal of Pavement PCCP, Sidewalks, Curbs, ~~Surface, Surface Milling,~~

etc. All concrete pavement PCCP, base course, sidewalks, curbs, gutters, etc., designated for removal shall be:

- (a) broken into pieces and used for riprap on the project; *or*
- (b) broken into pieces, the maximum weight of which shall be 68 kg (150 lb), and incorporated into the work as directed; *or*
- (c) otherwise disposed of in accordance with 202.02.

~~Removal of pavement~~ *Pavement removal* shall consist of the removal and satisfactory disposal of

~~portland cement concrete pavement PCCP; portland cement concrete PCC resurface with its base; or~~
 the total of any combination of HMA base, intermediate, and surface course of any pavement on a portland cement concrete base, including the base. ~~Each complete pavement removed will be considered as a separate item and paid for as such when removed.~~ Pavement removal shall include only the removal and disposal of existing public road, street, and alley pavement as required for the planned construction. Curb removal shall include curb that is separate from the pavement or removed separately. Integral curb that is removed with the adjacent pavement shall be paid for as pavement removal. Prior to performing the work of pavement removal at locations shown on the plans or where directed, cement concrete pavement to be removed shall be cut with a power driven concrete saw along designated lines. Sawing shall be such that any portion of the pavement to remain in place will not be damaged. Any portion that is damaged or removed outside the designated lines shall be replaced with no additional payment. Sawing of pavement to be removed will not be paid for directly, but shall be included in the cost of pavement removal.

SECTION 202, DELETE LINES 201 THROUGH 247:

SECTION 202, BEGIN LINE 533, DELETE AND INSERT AS FOLLOWS:

~~Surface removal will be measured by the square meter (square yard) of the area removed.~~

~~Surface milling, asphalt; and surface milling, portland cement concrete will be measured by the square meter (square yard) of the milled area.~~

Pavement removal will be measured by the square meter (square yard) of the area removed.

SECTION 202, BEGIN LINE 605, DELETE AND INSERT AS FOLLOWS:

~~Surface milling will be paid for at the contract unit price per square meter (square yard) for surface milling, asphalt; or surface milling, portland cement concrete.~~

~~Removal of surface will be paid for at the contract unit price per square meter (square yard) for surface, remove.~~

Pavement removal will be paid for at the contract unit price per square meter (square yard).

If there is no pay item for pavement removal and such is encountered, payment will be made for each square meter (square yard) removed. Such pavement removal shall apply only to portland cement concrete pavement or base. A unit price for this work will be established based on thickness, quantity, and removal process. Such unit price will be generated prior to the work being performed. If portland cement concrete pavement has an asphalt overlay, its removal will be considered as incidental, for which no direct payment will be made.

SECTION 202, AFTER LINE 625, INSERT AS FOLLOWS:

Pavement Removal.....m2 (SYS)

SECTION 202, BEGIN LINE 648, DELETE AS FOLLOWS:

~~Surface Milling, Asphalt.....m2 (SYS)~~

~~Surface Milling, Portland Cement Concrete.....m2 (SYS)~~

~~Surface, Remove.....m2 (SYS)~~

SECTION 202, BEGIN LINE 771, DELETE AS FOLLOWS:

~~The costs of milling material and the removal of such material from the project site shall be included in the cost of surface milling.~~

SECTION 306, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 306 –~~Blank~~ MILLING

306.01 Description. *This work shall consist of the milling of asphalt and concrete pavements and the disposal of milled materials.*

CONSTRUCTION REQUIREMENTS

306.02 General. *Milling operations shall be described in the QCP in accordance with ITM 803. Where the milling operation in a partial-day closure results in a vertical or near vertical face exceeding 38 mm (1.5 in.) in height, the adjacent lane shall be milled during the same day, the milled lane resurfaced during the same day, or the vertical face tapered at a 45° angle or flatter. Where located within 75 mm (3 in.) of a curb, surface material that cannot be removed by the cold-milling machine shall be removed by other approved methods.*

Transverse milled vertical faces greater than 25 mm (1 in.) that are exposed to traffic shall be transitioned in an approved manner.

Castings located in milling areas that are not to be adjusted may remain in place during the milling, or may be removed and replaced at the Contractor's option.

Localized weak areas uncovered by the milling process shall be patched in accordance with 304 or 305.

The milled material shall become the property of the Contractor, unless otherwise specified.

The roadway shall be cleaned before opening to traffic.

306.03 Equipment. *Equipment for milling shall be in accordance with the following.*

(a) Roadway Milling Machine. A milling machine shall be a power operated cold-milling machine, equipped with automatic control devices to establish profile grades by referencing from either the existing pavement or from independent grade control. The equipment shall have a positive means of controlling cross slope elevations, have an effective means for removing excess material from the surface, preventing airborne dust escaping from the operation, and producing a finished surface that provides a good bond to the new overlay. Sufficient cutting teeth shall be on the cutting drum to produce cuttings such that 90% of the conglomerate particles pass a 50 mm (2 in.) sieve.

(b) Power Saw. *Sawing equipment shall be capable of maintaining the specified alignment and depth of cut without damaging the pavement.*

(c) Rotary Power Broom. *A motorized, pneumatic tired unit with rotary bristle broom head.*

(d) Straightedge.

1. Straightedge – 4.9 m (16 ft). *A 4.9 m (16 ft) straightedge shall be a rigid beam mounted on two solid wheels on axles 4.875 m (16 ft) apart. The straightedge has a mounted push bar to facilitate propelling the device along or across the pavement. Tolerance points are located at the 1/4, 1/2, and 3/4 points and may be composed of threaded bolts capable of being adjusted to the tolerance required.*

2. Straightedge – 3 m (10 ft). *A 3 m (10 ft) straightedge is the same as a 4.9 m straightedge except that the wheels are mounted 3.048 m (10 ft) apart. A handheld rigid beam may be substituted.*

306.04 Asphalt Scarification and Profile Preparation. *Asphalt scarification and profile preparation shall consist of preparing a base for resurfacing by removing existing asphalt material. The entire existing asphalt surface shall be roughened by the operations. The existing pavement shall be milled to the cross-slope as shown on the plans, and shall have a surface finish that does not vary longitudinally more than 6 mm (1/4 in.) from a 4.9 m (16 ft) straightedge or as described in the QCP in accordance with 401.02. The milled surface shall have macrotexture equal to or greater than 2.2 for single course overlays and 1.8 for multiple course overlays in accordance with ITM 812. Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 3 mm (1/8 in.) when measured with a 3 m (10 ft) straightedge.*

Milled mainline areas left open to traffic for longer than 5 work days will be assessed \$1000.00 per day per lane kilometer (\$1600 per day per lane mile), or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

306.05 Asphalt Milling. *Asphalt milling shall consist of preparing a base for resurfacing by removing the existing asphalt material at a specified average depth. The existing pavement shall be milled to the cross-slope as shown on the plans, and shall have a surface finish that does not vary longitudinally more than 6 mm (1/4 in.) from a 4.9 m (16 ft) straightedge or as described in the QCP in accordance with 401.02. The milled surface shall have macrotexture equal to or greater than 2.2 for single course overlays and 1.8 for multiple course overlays in accordance with ITM 812. Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 3 mm (1/8 in.) when measured with a 3 m (10 ft) straightedge.*

If shoulders or turn lanes are not milled and the overlay material is not placed in the milled areas within the same day, drainage slots shall be provided to eliminate ponding of water.

Milled mainline areas left open to traffic for longer than 5 work days will be assessed \$1000.00 per day per lane kilometer (\$1600 per day per lane mile), or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

306.06 Asphalt Removal. *Asphalt removal shall consist of complete removal of asphalt by milling from a portland cement concrete or brick base and the satisfactory disposal of the milled materials. Minor amounts of asphalt pavement material bonded to a concrete base at joints or cracks may remain in place. If this material becomes displaced during subsequent operations it shall be removed. Minor amounts of asphalt pavement material bonded to a brick base may remain in place. Removal of minor areas of portland cement concrete or brick base during the milling operations is acceptable.*

Milled areas shall be cleaned prior to reopening to traffic or before continuing construction operations.

306.07 PCCP Milling. *PCCP milling shall consist of preparing a base for resurfacing by removing the existing PCCP material at a specified average depth. The existing pavement shall be milled to the cross-slope as specified in the plans, and shall have a surface finish that does not vary longitudinally more than 6 mm (1/4 in.) from a 4.9 m (16 ft) straightedge or as described in the QCP in accordance with 401.02. The milled surface shall have macrotexture equal to or greater than 1.8 in accordance with ITM 812. Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 3 mm (1/8 in.) when measured with a 3 m (10 ft) straightedge or as directed by the Engineer.*

A milled surface shall not be left open to traffic for longer than 14 calendar days. If the milled surface is not overlaid after 14 calendar days, \$1000.00 per day per lane kilometer (\$1600 per day per lane mile), or portion thereof, will be assessed as liquidated damages, not as a penalty, but as damages sustained for each calendar day that the milled area remains left open to traffic.

306.08 Transition Milling. Transition milling shall consist of cutting a wedge at the beginning and ending of projects, drives, paving exceptions and public road approaches. The existing pavement shall be cut to provide a vertical face of 38 mm (1.5 in.) for the termini of each overlay lift of base, intermediate, or surface. The existing pavement shall be milled at a rate of 60:1 or as directed to achieve the specified cut where the pavement transition overlay lifts differ from cut depth. Pavement transitions for driveways and public road approaches will only be cut for the surface course.

Automatic control devices will not be required on surface milling equipment used for transitions cut off the mainline. Cutting shall not damage any pavement that is to remain in place.

306.09 Method of Measurement. Asphalt milling, asphalt removal, PCCP milling, scarification/profile milling, and transition milling will be measured by the square meter (square yard) of the milled area.

306.10 Basis of Payment. *Asphalt milling, asphalt removal, PCCP milling, scarification and profile milling, and transition milling will be paid for at the contract unit price per square meter (square yard).*

Payment will be made under:

<i>Pay Item</i>	<i>Pay Unit Symbol</i>
Milling, Asphalt, _____ mm (in.) <i>thickness</i>	m2 (SYS)
Milling, Asphalt Removal.....	m2 (SYS)
Milling, PCCP.....	m2 (SYS)
Milling, Scarification/Profile.....	m2 (SYS)
Milling, Transition	m2 (SYS)

The cost for castings removed and replaced at the Contractor's option in accordance with 306.02 shall be included in the cost of the milling.

Any portion of the pavement that is damaged or removed outside the milling limits shall be replaced with no additional payment.

The cost of tapering of vertical faces and removal of milled material from the project site shall be included in the cost of milling.

The cost of cutting of the surface course shall be included in the milling.

Utility Coordination Certification for Short Term Projects

Contract No. RS-27291 Des No. 0300693

Project Description: QC/QA HMA overlay on SR 25 from SR 32 (RP: 0+00) to

US 136 (RP: 4+31) near Waynetown, IN. Montgomery Co.

The undersigned certifies they have made a diligent effort, consistent with INDOT guidelines for coordination of short term projects, to identify and show all known utilities within the limits of this contract. All known utility companies have been provided with plans or other information that clearly identifies the scope of this contract. Utility relocation plans and schedules, where provided, for all utilities expected to be in the way of construction in this contract have been reviewed, coordinated, and approved or forwarded to the Owner for approval. The "Existing Conditions of Utilities" statements included in this contract include utility names, contact persons' names and phone numbers, and relocation descriptions and schedules, where provided, for all utilities found to be within the limits of this right-of-way.

The Utility Coordinator is not responsible for utility companies who have failed to cooperate, respond, and/or provide information needed. Further, Utility Coordinator does not guarantee or warrant in any way the accuracy of information supplied by utility companies.

UTILITY COORDINATOR

Signed

Date; 8/1/2003

Printed

Approval to use "Short Term" Utility Coordination Process

Reason for Approval: Contract duration is 28 workdays

The undersigned approves of the use of the "Utility Coordination Process for Short Term Projects" for this contract.

Acting DISTRICT DEVELOPMENT ENGINEER/SPECIALITY PROJECTS GROUP MANAGER

Signed

Date: Aug 4, 2003

Printed